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Interconnected Conveying System

Materials-Handling Methods of Marmon Motor Car Co. in Producing Cars from Parts—Several Types of Equipment Used

BY BURNHAM FINNEY*

CHARACTERISTIC of the automobile industry has been the pioneering spirit which has given impetus to the development of new manufacturing methods and to the creation of what, for lack of a better term, has been called mass production. Especially in the past few years has the intense competition among automobile makers accentuated the need for finding new ways and means of lowering production costs and at the same time attaining the highest possible efficiency. As a result, new achievements in this direction constantly attract the attention of industry in general.

Introduction of new models is a serious problem, often calling for the rearrangement of production lines so that the available space can be utilized to the best advantage. Such was the problem of the Marmon Motor Car Co., Indianapolis, when it decided to put on the market its new "68" straight-eight car, for it was confronted with the necessity of revamping its plant No. 2 for this purpose. By adopting certain methods previously used successfully, and by installing a complete system of materials-handling equipment, the company has been able to turn out completed automobiles at a satisfactory cost.

Following its policy adopted several years ago, of eliminating stock rooms, the company has made provision in plant No. 2 for delivery of materials to points where they are needed in the assembly lines. Wide aisles afford opportunity for motor trucks to drive into the factory and unload parts at convenient locations, while spur tracks from the main line of the Pennsylvania Railroad extend into the building at its southeastern end. The floor of the freight cars is level with the concrete floor of the factory, so that loading and unloading are facilitated. By means of this arrangement, automobile frames, for example, can be brought into the plant in freight cars, removed and stored near the beginning of the frame assembly line. However, if frames are to be delivered by motor truck, the trucks can be driven along an aisle to a point immediately adjacent to the frame assembly line.

Coming Off the Body Upfit Conveyor, the Body Is Mounted on the Chassis by Means of an Overhead Crane Operating on a Monorail (G in plan, page 138). The lifting frame has special clamps to hold the body

Adhering to the policy instituted in the Marmon plant No. 3, the company has so placed stock bins in plant No. 2 that workmen can get what they want without going to a centralized stockroom. For instanee, along the body upfit assembly line are storage bins containing materials for local use.

Four divisions of the plant are served by mechanical conveying equipment: the frame assembly line, the body upfit line, the machine shop and the chassis main

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assembly line. Supplementing these is an automatic continuous enameling oven in which fenders, side shields and small parts are enameled.

Consisting of a motor-driven belt conveyor approximately 160 ft. in length, the frame assembly line has several interesting features. Frames stored near the beginning of the line are placed immediately adjoining the conveyor in a pile six or seven frames high. They are lifted on to the conveyor by means of a special carrier suspended from a hand crane. The carrier has four hooks which fit under the frame and hold it firmly while it is being moved on to the conveyor, the frame being placed in a crosswise position. Under normal conditions the conveyor operates at a speed of 15 in. a minute for 100 cars a day. The frame goes through a spray booth while upside down, receiving a coat of lacquer.

At right angle to the frame assembly line is the chassis main assembly line. When the chassis reaches the latter it is upside down, but it is put in the proper position on the main assembly line by means of an automatic turnover device designed by the company. The main assembly line comprises two parallel belt conveyors arranged so that the wheels of the car rest on them. The conveyors move 35 in. a minute for a production schedule of 100 cars daily. The conveyors, the speed of which may be adjusted to meet production demands, make possible the progress of the chassis without moving the wheels of the cars.

Each chassis starting down this line reaches the end, 480 ft. distant, a finished automobile [480 ft. ÷ 35 in. a minute = 145 min., or 2 hr. 25 min.]. After the chassis leaves the turnover, the motor and the battery are set into position. A short distance farther along the line the body, coming off the body upfit conveyor, is mounted on the chassis by means of an overhead crane operating on a monorail. The monorail forms a rectangle the length of which runs for 50 ft. parallel to and directly over the main assembly line. Suspended from the crane is a lifting frame with special clamps to hold the body.

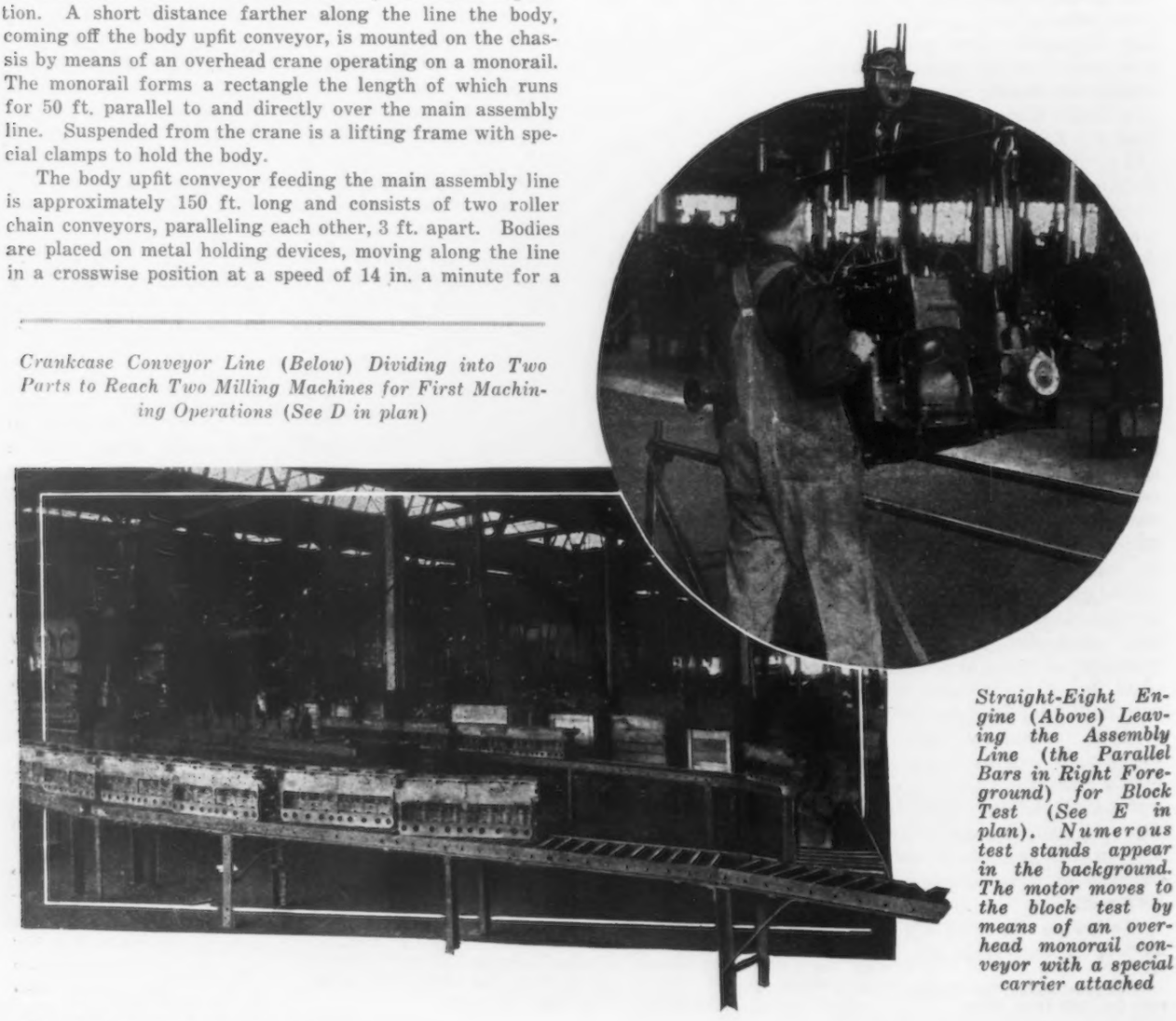
The body upfit conveyor feeding the main assembly line is approximately 150 ft. long and consists of two roller chain conveyors, paralleling each other, 3 ft. apart. Bodies are placed on metal holding devices, moving along the line in a crosswise position at a speed of 14 in. a minute for a production schedule planned to make 100 cars daily.

Since the acid fumes from the battery room would tend to rust the metal parts if placed in close proximity, that room is located a considerable distance from the main assembly line. Batteries move from this point to the far side of the assembly line, where they are installed on the chassis by means of a gravity roller conveyor.

From the point where the body is mounted on the chassis, the car progresses steadily to the final inspection pit, where it leaves the conveyor. En route the fenders, hood, rims, lamps, hub caps and step plates are added and the four-wheel brakes are adjusted. After the car has been thoroughly inspected, it is driven by its own power from the pit, the left wheels passing over a "trip" in the track, which automatically lowers and raises a screen for the purpose of focusing the head lights.

In the machine shop, where the parts making up the motor are machined, and where the motor is assembled and tested ready for installation in the chassis as it moves along the main assembly line, practically all materials are handled mechanically. Crankcases are delivered by the (outside) maker to a storage yard just outside the machine shop and adjoining the normalizing ovens. All-metal trucks are loaded with crankcases, are moved into the ovens, to remain for a stated period, and then are pushed into the machine shop. Here they are unloaded near the shot blast booth, where the crankcases are cleaned preparatory to starting their journey down the crankcase line.

From the shot blast booth the crankcases are carried on a roller conveyor through all of the machining operations



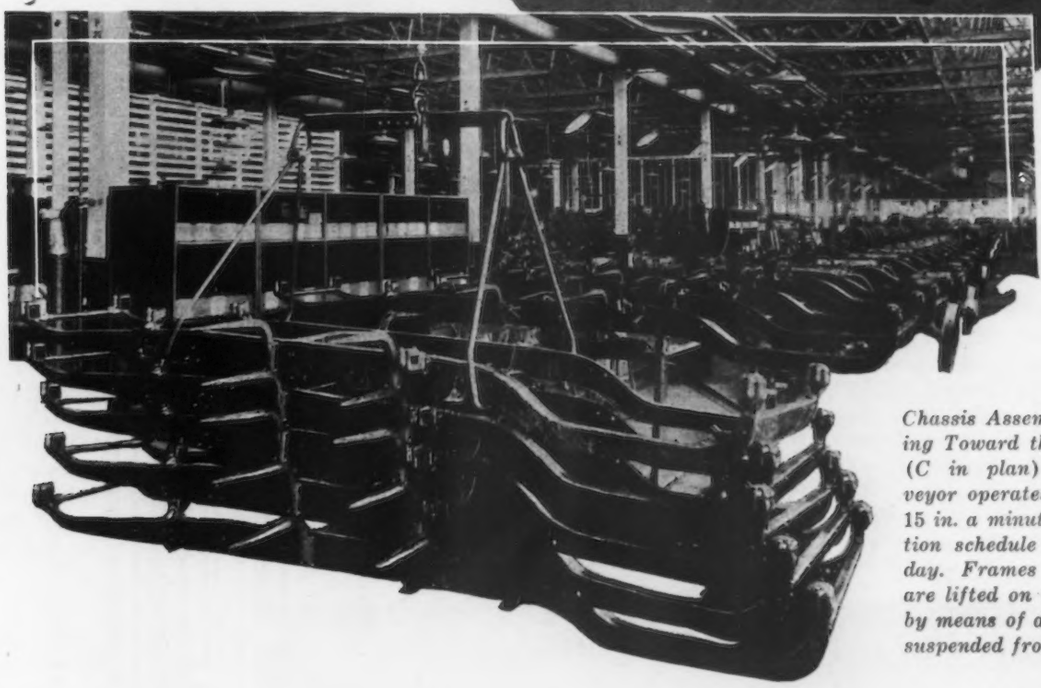
Crankcase Conveyor Line (Below) Dividing into Two Parts to Reach Two Milling Machines for First Machining Operations (See D in plan)

Straight-Eight Engine (Above) Leaving the Assembly Line (the Parallel Bars in Right Foreground) for Block Test (See E in plan). Numerous test stands appear in the background. The motor moves to the block test by means of an overhead monorail conveyor with a special carrier attached

to the motor assembly line. After leaving the shot blast booth, they pass through a small spray booth, where they are given a sealing coat on the inside of the case. A few feet farther along the line the conveyor track divides into two parts, so that the crankcases can pass under two Ingersoll milling machines for the first machining operation. The division of the track at this point permits two crankcases to be milled at the same time, delay in the movement of material down the conveyor line being thus avoided.

After the crankcases have been milled, the two tracks are merged again into one for continued progress along the line. For some machining operations it is necessary to remove the crankcases from the conveyor by means of an overhead hoist, to place them in the proper position to be machined.

The crankcase conveyor line is paralleled by other lines along which parts going into the motor are transported. For instance, bearing caps, connecting rods, flywheels and pistons have separate roller conveyors along which they progress to a point where the connecting rods and pistons are assembled.



Freight Car on Depressed Track (Above) Showing Material Being Unloaded to Frame Assembly Line. Floor of freight car is level with floor of building. (See A in plan)

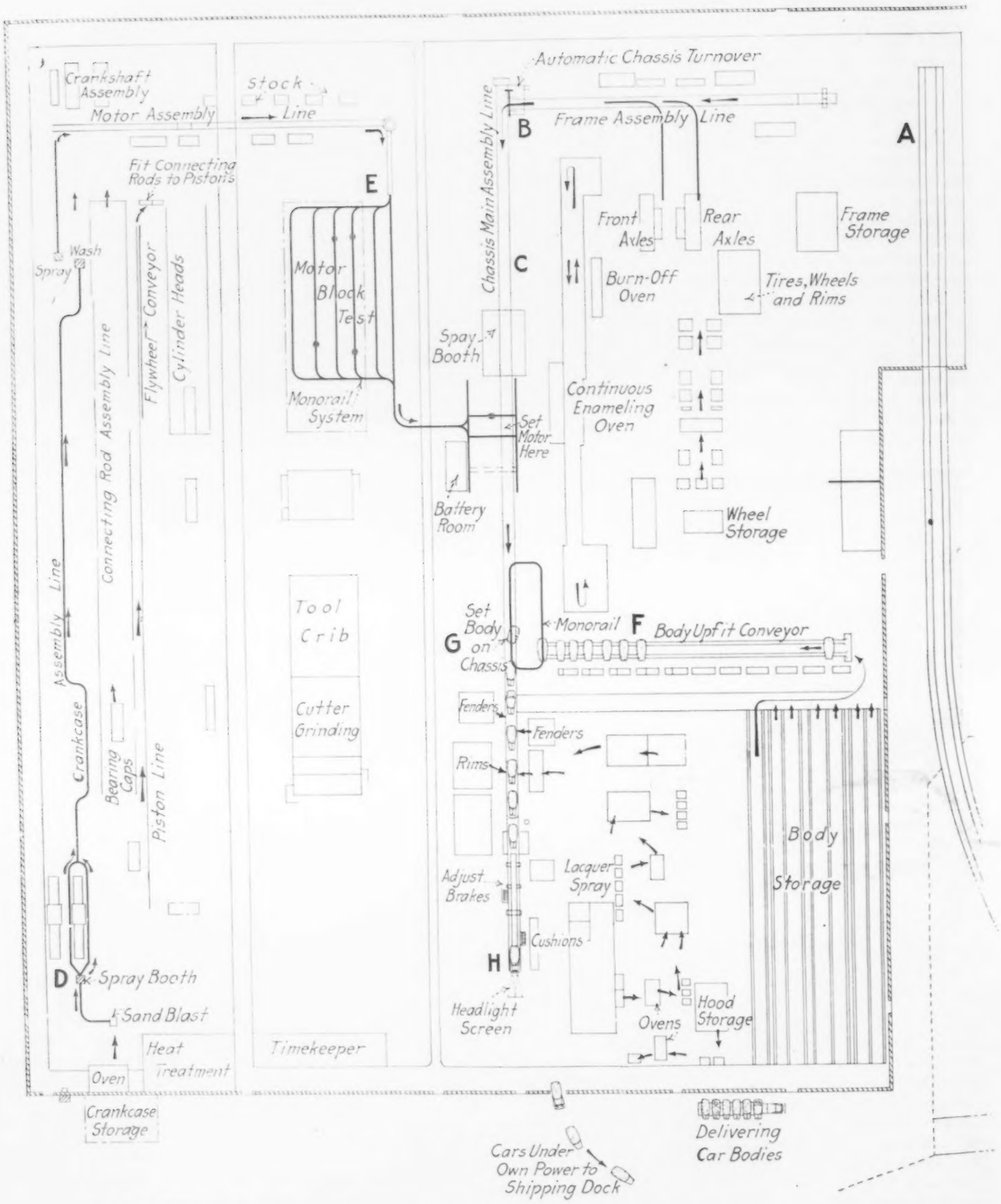
Chassis Assembly Line Looking Toward the Spray Booth (C in plan). Frame conveyor operates at a speed of 15 in. a minute for a production schedule of 100 cars a day. Frames (upside down) are lifted on to the conveyor by means of a special carrier suspended from a hand crane

At right angle to the crankcase line is the motor assembly conveyor line. Approximately 175 ft. in length, this line consists of an iron framework supporting two parallel iron bars located at a convenient working height. Small special holders, which are attached to each of the four corners of the motor, rest and slide on the bars, thus permitting the motor to be suspended between the bars. In this position the motor can easily be moved by hand down the assembly line. When the motor starts its journey down the line it is upside down; it is righted at the proper place by a turnover fixture devised by the company.

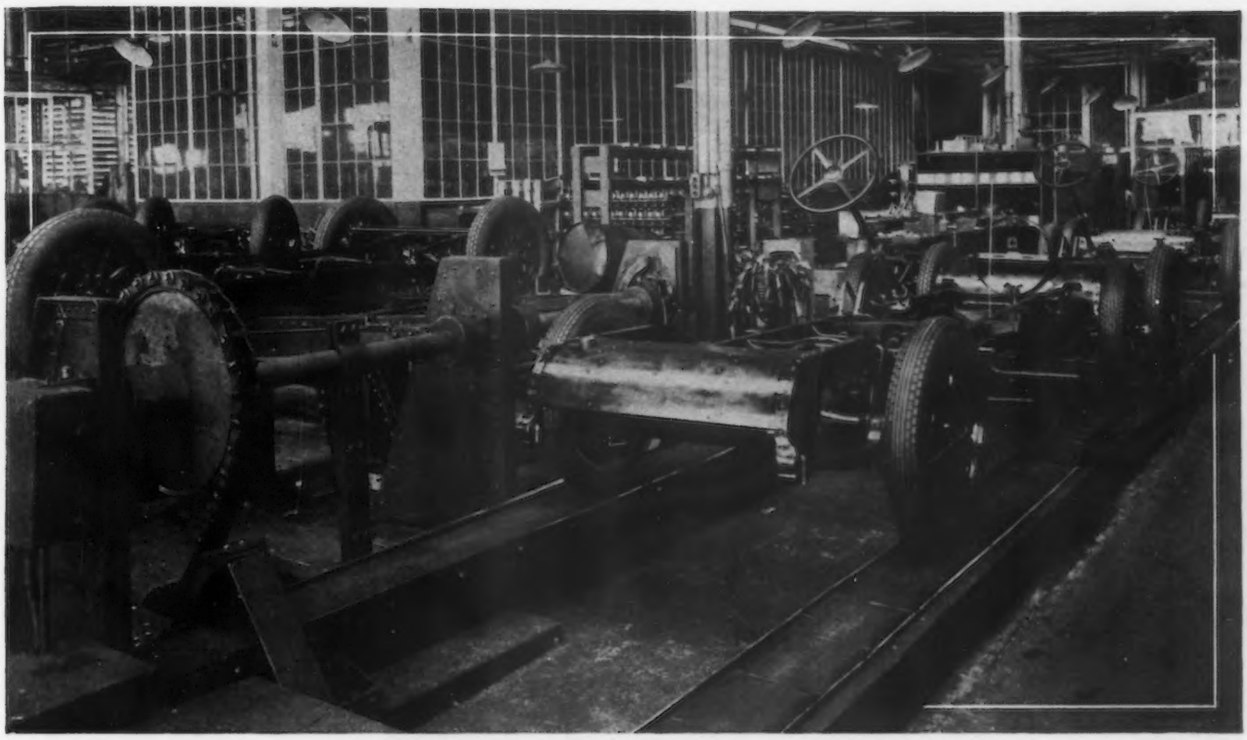
Reaching the end of the assembly line, the motor is lifted by a special carrier depending from an overhead monorail and is moved to the motor block test. This part of the shop is served by an extensive monorail system installed by the Louden Machinery Co., Fairfield, Iowa. After the block test has been completed, the motor is taken by monorail to the main assembly line, where it is lowered into position in the chassis.

Fenders, running boards, side shields and small parts are run through a burn-off oven near the mechanical enameling oven, where they are thoroughly cleaned by burning. They are removed to stands and sanded and then delivered to a small dust-proof room, where they are dipped in a primer coat. A conveyor carries them along, draining as they go, through a continuous oven, where the priming coat is baked on. At the end of the oven the operation is repeated with a coat of enamel, after which the parts are

Assembling the Marmon Car in Plant No. 2



LAYOUT of the Assembling Portion of the Marmon Plant, Showing Flow of Materials and Parts from Points of Receipt into the Finished Car, Ready to Drive Away Under Its Own Power. Letters A to H refer to photographs showing how the various items are handled. It will be noted that the engine is assembled at left and the chassis at upper right. The body strikes across the center and all come together in the main line running from top to bottom of drawing



At Beginning of Car Assembly Line, Showing the Chassis Turnover Fixture (B in plan) in the Left Foreground and the Flat Traveling Conveyors Which Make It Possible for the Chassis to Be Moved Along the Assembly Line Without Moving the Wheels

inspected and delivered to the assembly line. After once being put on the conveyor, the parts are untouched by workmen until they are completely enameled and ready for use. The continuous enameling conveyor is 195 ft. long and travels at a speed of 18 in. a minute for a production schedule of 100 cars a day.

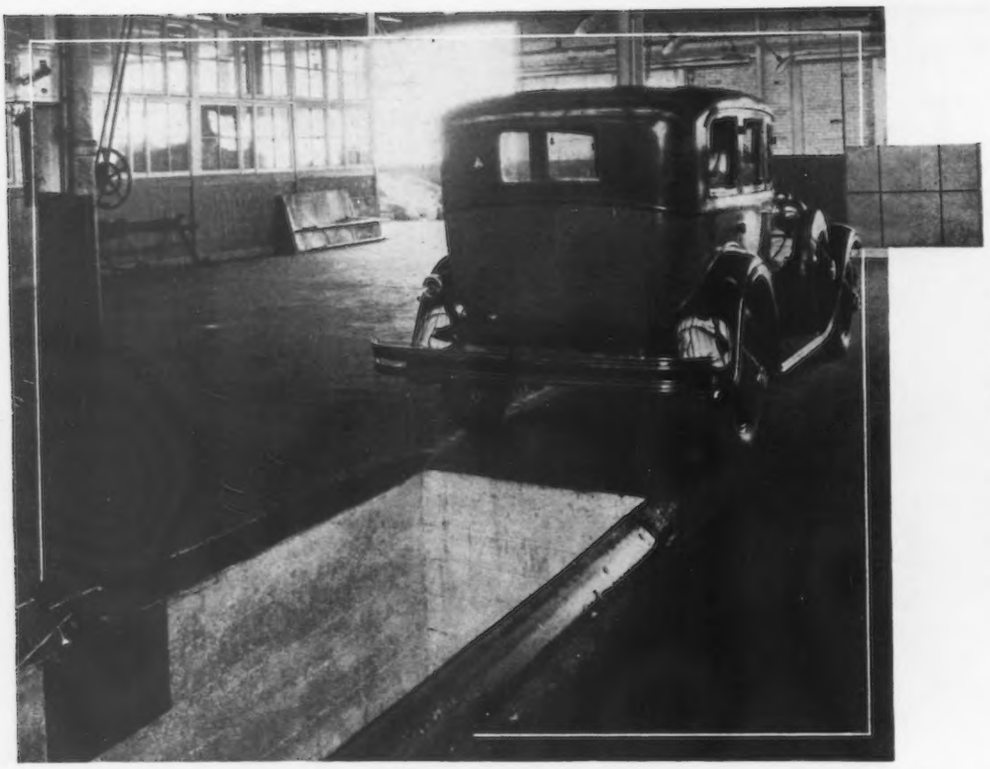
In addition to the various handling arrangements already described, the company uses electric lift trucks rather extensively for moving stock about the plant. For example, lift platforms are taken by electric trucks to the doors of freight cars which are to be unloaded. Here workmen remove the material from the cars by hand and place it on the platforms. When the platforms are loaded to capacity, they are carried by electric truck to the points in the assembly lines where the material is needed.

The roller conveying system in the machine shop was manufactured and installed by the Mathews Conveyor Co., Ellwood City, Pa. However, much of the mechanical handling equipment, especially along the assembly lines, was designed and installed by the Marmon company.

Study of the plan on the opposite page shows how well the entire series of assembling operations has been dovetailed into a completed whole. One entire section—the left side of drawing, and nearly half the total area—has been set aside for putting the engine together, and testing it as an assembled unit. It then passes to the main assembly line at almost the center of the picture.

Meantime two other operations, under way simultaneously with the first, have prepared the chassis to receive the engine and the body to be placed upon the chassis. In both cases the movement is from the right of the plan toward the left, the chassis progressing along the top and the body

Bodies on Conveyor (F in plan), Where Their Fitting Is Completed Before They Are Mounted on Chassis. The body upfit conveyor consists of two roller chain conveyors paralleling each other, 3 ft. apart. Bodies move along this line at a speed of 14 in. a minute for a production schedule of 100 cars daily



End of Car Assembly Line Just Beyond the Inspection Pit, Showing at Extreme Left the "Trip" in the Track, Which Operates a Counter Device and Focuses the Screen for Headlights (See H in plan). This screen appears at right of illustration. From this point the car is driven under its own power to shipping dock

squarely across the middle. Speeds of conveyors are worked out to synchronize the various movements to such effect that there will be no waiting at any point along the line. These speeds are task-setters for the men, whose motions fit in with those of the mechanical appliances in forming a completed car within an appointed time.

What Standards in Industry Mean; Some Limitations

THE May number of the *Annals* of the American Academy of Political and Social Science is given up completely to the subject of standardization in industry and what it means to manufacturer, distributer and consumer. There are 36 articles, each from an expert in some particular line of the work, and divided into four groups. Part I covers standardization programs in industry; part II, standardization programs of specific industries; part III, standardization programs outside of industry; part IV, standardization and the consumer. The latter includes the steps which are being taken by the Government to protect the consumer through certification of standard specifications.

In a foreword, Richard H. Lansburgh, professor of industry at the University of Pennsylvania, says, among other things: "That the development of standardization in industry has been one of the most significant phases of the new industrial management has come to be known to even those who have but a passing knowledge of modern industrial conditions. . . . That there are limitations to the extent of standardization is fully realized by all who have been associated in the work, and those articles which dwell on this phase should serve as a ready reference check on enthusiams which carry a good cause to extremes."

One feature brought out in a discussion of simplification and standardization in Europe concerns British standardization. A considerable sum of money has been appropriated to have existing British standards translated into foreign languages. This has for its object the possibility of use of these standards by foreign purchasers, thus increasing the market for British goods.

One of the limitations on standardization is pointed out by K. H. Condit, editor *American Machinist*. It relates to the early development stages of the automobile, 25 years ago. "Most of the designs were experimental and were subject to radical changes each year, and sometimes oftener. Any effort to standardize then would have resulted either in failure or in a retarding of development quite as bad."

Later on Mr. Condit says, regarding international standardization: "Size standardization is almost impossible because of variations in measuring units. The great bulk of the [world's] manufacturing is done in Great Britain and the United States, to English units, while the minor part is done in many other countries, to metric units. A little progress [toward standardization between the units] has been made with ball bearings and screw threads."

This standard size as between measuring units is brought out differently in another article devoted to filing equipment. Filing cards are now standardized in inches: 3 x 5, 4 x 6, 5 x 8, etc., in place of the metric system used in the early development of this phase of industrial control. Today the only metric cards in use, with few exceptions, in the United States are found in libraries or scientific institutions.

This question of filing equipment goes rather deeply into standards for steel filing cabinets and drawers. Standards are laid down for the various panels and dividing elements, both as to gage of steel and as to grade of sheets. A sample specification is given, with considerable discussion as to reasons for the adoption of each item.

Cross indexing in the rear of this 282-page volume occupies no less than 9 pages. This should be of great value to anyone consulting the volume, which is primarily one of reference.

Wear Testing of Various Metals

Steels and Bronzes Covered in Methods Detailed By Research Men — Efforts to Make Laboratory Simulate Service

SEVERAL papers presented before the thirty-first annual meeting of the American Society for Testing Materials at Atlantic City in the last week of June dealt with tests of metals or other materials, to determine their resistance to wear. Both steels and non-ferrous metals were included in the four papers, of which abstracts appear below.

Wear Testing of Various Types of Steels

IN this paper, which was presented by J. M. Blake, engineer of tests American Manganese Steel Co., Chicago Heights, Ill., apparatus was described which has been developed to test the resistance of metals to abrasion under so-called wet grinding conditions. In principle, the machine is an accurately controlled grinding machine in which all conditions as to abrasive, pressure, speed, time and moisture or other liquid content are under the operator's control.

It is possible to approximate any given set of practical requirements. The wear is measured by the amount of metal worn off in approximately 15,000 ft. of travel at a speed of 125 ft. a minute. A pressure of 50 lb. to the square inch is used on a testing face of approximately 3 sq. in. The wear thus determined is expressed as the ratio of wear loss compared with a standard (commercially pure iron) at 100. By varying the abrasive used it has been possible to develop alloys specifically adapted to particular field requirements.

How the Abrasive Is Held to Its Work

Pressure between specimen and abrading service can be adjusted from 0 to approximately 500 lb. to the square inch. The pressure can be set or read without stopping the machine. The specimen engages the abrasive coated copper surface at an angle of about 30 deg. This acute forward angle serves to funnel the powdered abrasive between the gliding surfaces. The abrasive is deeply indented into the soft copper ring which serves as the bond for holding and forcing the particles of abrasive across the surface of the specimen.

On the equipment described, which has a ring 4 ft. in diameter, over the periphery of which the specimen is run, the standard test is 1200 revolutions. This gives approximately 15,000 ft. of travel, as above. The amount of metal worn off during such a test may vary from 3 gm. for some exceptionally hard steels to 150 gm. or more for alloys with a high abrasion factor. This Fahrenwald abrasion factor against sand, for several well known materials together with several new very hard alloys, is as follows:

Standard specimen (commercially pure iron)	100
Merchant bar iron, annealed	92
White iron	88
Manganese steel	77
Tool steel, hardened	76
White iron, chilled	72
High-speed metal, hardened	57
Stellite (welded wearing face)	51
Amsco alloy No. 459 (welded wearing face)	31
Amsco alloy No. 459 (as cast)	10

Wearing Qualities of Tire Chains

TO study the wear-resisting properties of steel for automotive tire chains a wear test developed was described in a paper by W. H. Parker, research engineer American Chain Co., Bridgeport, Conn. Specimens may be of almost any shape, including chain links already formed. They are held at constant pressure against a rotating alundum grinding wheel of which the surface is kept continually dressed. Automatic record is obtained of the number of revolutions required to produce a given depth of wear.

As the service to which tire chains are subjected involves the relation between impact and wear resistance, a somewhat theoretical discussion is given of this relation as applied to the links of a tire cross chain. Some results of wear tests were reported. Comparison with service tests indicates that the laboratory test rates various materials in practically the same order as road tests, while giving a much greater distinction between them. The laboratory test furnishes a relatively quick means for comparing different materials and different heat treatments.

Relating Laboratory Tests to Road Tests

Making a comparison between a machine test and a service wear test in which the different materials were treated alike in each case, one material showed a loss in weight of 5 per cent in service and 14.4 per cent in the machine. A second material showed losses of 7.7 per cent and 19.6 per cent in service and machine. A third material showed 8.4 per cent and 26 per cent; a fourth, 8.6 per cent and 23.7 per cent; a fifth, 9.1 per cent and 27 per cent. Only in the cases of the third and fourth was the order of resistance varied as between the two kinds of tests.

As the relatively ideal conditions under which laboratory determinations are made do not obtain in service, it is somewhat difficult to check the results of the one with the other. For some materials certain other factors may have an influence upon the life of the cross chain, such as liability to failure under repeated impact or tendency of certain sections of the link to develop cracks under heat treatment. In general, however, it has been found that the correlated results of the laboratory tests give a reliable index of the service qualities of cross chains.

Wearing Tests of Manganese Steel

DEVELOPMENT of a test for the wearing properties of 12 per cent manganese steel was described in a paper by John Howe Hall, metallurgical engineer Taylor-Wharton Iron & Steel Co., High Bridge, N. J. It was endeavored to find a test which would give results comparable with service experience. A number of crude methods were abandoned after trial, usually because they were too slow or too clumsy or did not give a true indication of the wearing properties.

Finally it was concluded to adopt the method of crushing known amounts of hard stone in a small laboratory stone crusher, in which the jaws were made of the steels

to be tested. The loss in weight of the jaws was ascertained at regular intervals. More recently wear tests have been made in the Ansler and the Brinell abrasion machines. But it was found that these machines do not simulate the particular kind of wear which manganese steel successfully withstands in service: that is, abrasion associated with severe cold working, such as obtains with the pressure exerted by the crushing of hard material. Hence the tests went back to the tedious but reliable jaw crusher.

In the paper details are given of tests in such a crusher of manganese steel, plain carbon steel, nickel steel, chromium steel and nickel-chrome steel. It was found that manganese outwore carbon steel about 10 to 1. Chromium decreased the wear of the pearlitic steels very little, if at all, but nickel decreased that wear to a marked extent.

Considerable Work Needed for Dependable Results

Two types of crushers were used, one with fixed jaws and the other with moving jaws. They did not give exactly the same line-up of materials, so far as resistance to wear was concerned, but both showed the 12 per cent manganese steel far superior to any of the others tested. It was found that when the jaws were first put to work the wear was much more rapid than at a later period. This is attributed in all of the specimens to surface decarburization of the steel. In the case of the manganese steel, and perhaps in some of the others, it is attributed also to the fact that the surface later becomes work-hardened by the pressure of the stone being crushed, and then gives greater resistance.

For this reason no test is considered of any value whatever in which only a few hundred pounds of stone are crushed. It can easily happen that a steel which would give excellent results on extended tests wears rapidly at first on account of a decarburized skin. Another and an inferior steel, so treated as to be less decarburized at the surface, might at first appear to be better than the good steel whose surface was decarburized. It has been the practice in these tests to weigh the jaws after each 4000 lb. of stone crushed. The loss in weight in grams is recorded and the loss in grams per square inch of jaw surface to each 1000 lb. of stone crushed. No high degree of accuracy is claimed for the results, but they are regarded as a reliable indication.

Tests of Railroad Bearing Bronzes

RESULTS of tests of copper-tin-lead alloys, both chill-cast and sand-cast, were reported in a paper by H. J. French, senior metallurgist United States Bureau of Standards, Washington. These tests were made for wear and the alloys were tested under friction without lubrication at temperatures from 70 to 300 deg. Fahr., under friction with a lubricant at 70 deg. and under tension with single-blow impact and repeated pounding at temperatures from 70 to 600 deg.

Generally speaking, chill-cast bronzes were less resistant to wear and to notched-bar impact than sand-cast bronzes. They were, however, more resistant to pounding and tension.

Increase in the proportion of lead, particularly in the range between ¼ and 10 per cent, improved the wearing properties but lowered the resistance to pounding, impact and tension. Increase in the tin component was found to improve all these properties. Increase in the temperature at which the test was run generally decreased resistance to tension, impact, pounding and wear. The changes from this cause were most marked between 350 and 600 deg.

High-Lead Bronzes Without Lubrication

In practical applications there are decided advantages in the high-lead bronzes for service where lubrication cannot be maintained. These bronzes containing about 12 to 25 per cent of lead did not wear so rapidly as the low-lead bronzes, nor assume so rough a surface, in tests without lubricant. If wear is the chief factor to be considered, and an approximately constant ratio is maintained between copper and tin, variations of lead within the range of 12 to 25 per cent seem unimportant.

Where it is important also to have a high resistance to pounding and a high static strength at both atmospheric and elevated temperatures, lead may advantageously be kept near the low limit of the range mentioned. Its strength and toughness to notched tests decrease as the proportion of lead increases. These differences, however, are relatively small, and for many purposes bronzes with from 15 to 25 per cent of lead are practically interchangeable.

When mechanical properties become of primary importance, and lubrication can be maintained so that wear is of secondary importance, there are advantages in low lead and high tin. Both these features favor high strength and resistance to pounding.

Tests Indicative, When Not Fully Conclusive

No one selected laboratory test yielded information adequate by itself for general comparisons. Each test, however, contributed valuable information in developing the characteristics of the different bronzes. In alloys, with practically constant ratio of copper to lead, an increase in tin from 0.7 to about 5 per cent resulted in a marked improvement in wearing properties in tests without lubricant. Further increase in the tin, however, up to 10 per cent did not materially modify the wearing properties, but resulted in improved tensile strength and resistance to pounding.

It has been shown that reproducible wear tests can be obtained in the laboratory. When combined with suitable mechanical tests, the results give comparisons consistent with practical experience.

Accuracy of Analysis for Oxygen and Hydrogen in Steel

In recent years much work has been done both here and abroad on the accurate determination of gas in metal. In order to compare the methods used in different steel-producing countries, the United States Bureau of Standards prepared a uniform sample of ingot iron, and distributed portions to various investigators. The iron contained 0.04 carbon, 0.03 manganese, 0.02 sulphur and 0.006 silicon. Analysis for gases gave the following results:

	Per Cent	
	Oxygen	Hydrogen
United States Bureau of Standards.....	0.058	0.0006
Institut für Eisenhüttenkunde.....	0.059	0.0008
University of Sheffield.	0.051	.....

The first two laboratories use a vacuum fusion method, melting in a graphite crucible contained in a high frequency furnace. The American method weighs the evolved gases, while the German method measures their volume. Hydrogen reduction of a solid sample (to which is added an antimony-tin alloy) is used at Sheffield.

It may be concluded that the three methods are of the same order of accuracy, and give comparable results when carefully performed by skilled analysts.

Industrial Standards No. 206 and 212 of the Bureau of Foreign and Domestic Commerce have been prepared in Portuguese text, and are on sale by the Superintendent of Documents, Washington, for 5c. each. These are respectively translations of American Society for Testing Materials standard specifications for carbon steel locomotive forgings, and for carbon steel and alloy steel forgings for general purposes.

Building Industrial Stock Values

Prices at Which the Return Is Only That of a Good Bond Need Not Be Called High If Management's Policy Insures Continued Success

BY STERLING H. BUNNELL*

WHEN, as at the present time, the common stocks of large, well-managed industrials reach prices such that the rate of return on the investment is no more than bond interest, it is commonly said that the prices of these stocks are too high. This may be so, in the sense that when such a belief is generally held, slackening of demand is easily possible, and prices consequently may fall. The feeling is general among old and experienced investors, who gained their knowledge by owning and trad- in Government and public utility securities, that industrial stocks are peculiarly hazardous investments, and that common stocks in particular should be bought only by speculators and then only on a basis of large dividend return.

Stocks and Bonds Hang Together

THIS reasoning is based on the idea that bonds and such preferred stocks as are secured by fixed assets can somehow be considered safe in any event against interruption of interest and loss of principal value, so that the rate of income paid, though low, is permanently assured. Bonds are frequently backed by mortgages on real estate, and the regular payment of interest is the first charge against earnings. But it is important to remember that, when a business ceases to earn a profit, the payment of interest must necessarily be suspended, and that it is not easy to liquidate the shrinking assets of an unprofitable concern so as to protect the bondholders' principal. In such an event, stockholders and bondholders alike lose their income, and the latter are only a degree less likely than the former to find their principal also lacking.

Only in the case of indispensable industries, like mainline railroads, is it generally possible for bondholders to exert their rights of foreclosure without fatal consequences or wiping out much of the value of the property. Industrials are combinations of plant, inventory and operating organization which can survive only if kept complete and in working order. The owners of a class of securities guaranteed by a mortgage on a part of such an inseparable combination hold Shylock's bond, which if collected would destroy the whole organization. Wise and upright judges have often intervened to prevent foreclosures likely to be of little advantage to the bondholder and disastrous to the other interests concerned.

*Consulting engineer, New York.

Every Form of Security Should Yield a Good Return

MANIFESTLY, successful operation of the corporation, so that a liberal percentage of profit is earned on the entire invested capital, is the only real assurance of security for the bonds, as well as for the stock. If the business earns just enough for bond interest and no more, the bonds cannot be given a high rating. If earnings just cover bond interest and stock dividends, neither bonds nor stock have an assured future; for well-equipped, successful industrials frequently are "depleting assets," just like mines, and productive efficiency and marketing methods are allowed to deteriorate with time, until only an idle factory adapted for making an unwanted product is left to be liquidated at its scrap value.

Depreciation tends to decrease the productive efficiency of plant and equipment, and obsolescence may even destroy the value of organization, product and business as well. If industrials are not to have, like mines, a limited term of useful existence, their life and energy must be continually renewed by methods of progressive development. Well-managed industrials ought not therefore to be expected to pay out substantially the whole of their earnings, by granting to their common stocks dividend rates two or three times the rate of income customarily paid on bonds.

Right Handling of Surplus

FROM the policy of paying a moderate regular dividend on the common stock and reserving a considerable part of the total net profit undistributed there results an accounting surplus which, if properly employed, will provide effective security for stocks and bonds alike. The scope and degree of security afforded depends, however, on the way in which the accumulated surplus is utilized; for surplus profits are not usually held in the form of cash or cash equivalents. This surplus may be invested in increases to the stock of materials on hand or work in progress, which may signify either its useful employment in increased business to earn additional profit, or its useless locking up in an idle excess of goods which better management would be able

MR. BUNNELL elaborates an idea that has had more and more attention in financial circles, and one that is giving a new investment standing to common stocks of industrial companies. He points out that well-equipped industrials may be "depleting assets," as mines are and cites with approval examples of the policy of treating common stocks like preferred, maintaining moderate regular dividends with the highest assurance of being able to continue them because of the wise use of surplus profits in development

to move and turn into cash. Again, surplus may be invested in additions to plant and equipment, capable (or incapable) of earning profit in proportion to the investment. As money cannot be "tagged" to locate the particular destination of each particular dollar, the accumulated surplus of past undivided profits, however invested in the business, may be considered to be just as, and no more, efficiently used in earning profits as the rest of the invested funds.

By investing it in the intangible asset of industrial development work, surplus may be even more effective in promoting the continuance of steady earnings. Industrials can be permanently successful only through an unceasing process of growth. Better methods and results, the discovery or adaptation of new products, and most of all, ever-increasing effectiveness of personnel, are required to cope with new conditions as and when they occur. Every function of industrial engineering is required in the constant endeavor to maintain and improve the operating efficiency of the large industrials. Research and invention are constantly employed to anticipate future marketing requirements and prepare to supply them. Selecting, training, retaining, insuring and satisfactorily paying the workers, superintendents and managing heads of the plants involve the maintenance of personnel department organization on a liberal scale of expenditure. All this development work looks toward insuring future success, and so is properly provided for by appropriations from the undivided surplus profit of previous years; but if treated as an element of present cost, the net amount for dividends would remain the same.

Function of Depreciation Reserves

DEPRECIATION reserves also, set aside by factory accountants as an item of operating expense so as to be included in cost accounting figures, can and should be utilized to strengthen the future position of the securities. As the depreciation charges do not represent actual expenditure, depreciation reserves, like surplus, usually offset investments in operating assets of inventory or accounts receivable, or additions to plant equipment which are not regarded as replacements or mere betterments. In modern, progressive industrials, plant and equipment are constantly being improved, so that the depreciation of that which is in use is continually balanced by the addition of entirely new equipment. By following this practice, these industrials always have plants so up to date that new money could not possibly construct more efficient ones. It would, of course, be possible to treat an industrial as a depleting asset, and so to invest the depreciation reserve in securities to form a sinking fund to reimburse the owners of the plant and wind up the business at a fixed date. But self-extinction is not the contemplated purpose of industrials generally. There need be no fixed span of corporation existence, if life and activity are constantly renewed by intelligent use of a portion of the earnings in development.

The Right Building Up of Security Values

IN the last twenty years a great corporation, which started with hugely watered stock, has steadily built up its effective investment until its securities represent a value far above par, although the rate of return on the market value is little more than current interest. Its plants, with respect to productive efficiency, are equal to the best. Another large corporation, with an output once classified as a luxury, with a few thousand possible purchasers among the wealthy small fraction of the population, has constantly developed product and methods of construction until the wildest assumptions of former enthusiasts have been surpassed by the cold facts of its operations. Another, holding fast to the rarely adopted principle of one unchanged design through many years, was all the time preparing by unadvertised development and the accumulation of huge reserves so that when the market for the standard design should become surfeited, a complete new design should be ready for prompt production. This was done at the proper moment without the slightest disturbance to the financial security of the corporation, and production and distribution of the new product proceeded on the previous enormous schedule. Many other American industrials might also be cited as examples of the success of the policy of treating common stocks like preferred securities, by maintaining moderate regular dividends with the highest assurance of continued ability to pay them, because of the wise use of surplus profits in development.

Surplus held in reserve by investment in current assets or income-paying securities is available for maintaining dividends in periods of earnings below average; and when such a reserve is provided for this purpose, common stock may be expected to pay an income quite as steady as preferred stock or bonds. But as a reserve cannot be inexhaustible, the important thing is to maintain an average rate of income sufficient for progressive renewal of the life and usefulness of the industrial, in addition to a reasonable rate of return on the invested capital used in the business.

Stock Values and Purchasing Power of Money

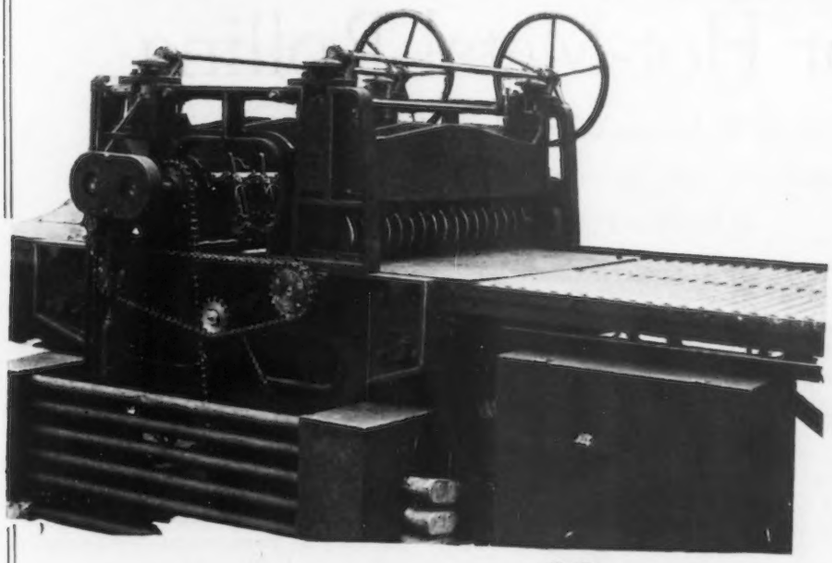
IT should be remembered that great changes in the purchasing power of money have taken place over a long period of years, and on the average the movement has gone a long way in the direction of reducing the value of the money unit. Owners of bonds and debentures have found that principal and fixed income alike have become less valuable in purchasing power, while standards of living have increased the demands on personal income. The owner of common stock possesses a fractional share in the value of the business, while the owner of bonds or debentures possesses only the equivalent of a certain number of dollars. The holder of common shares may reasonably expect that the prices of the securities will rise as affected by a general decrease in the purchasing power of money, and he may well prefer that accumulated surplus be used to develop further earning power, rather than held as a fund at interest and nothing else.

The policy of forward development, adopted by a large proportion of our industrials, has resulted in large increases in the market values of their shares. The common stocks of corporations so managed, paying steady, low rates of dividends from comparatively large surplus earnings, sometimes become known as "rich men's stocks," because they are bought and held by the wise and far-seeing investors who are generally found in the wealthy class, wherever they may have started in the process of accumulation of their savings. To these men, the steady increase of principal value is preferable to the receipt of high dividends which are uncertain of continuation, in the event of any severe disturbance to the accustomed routine of the business of the corporation.

Stock prices on the basis of returns little greater than for good bonds are not necessarily too high; certainly they are not to be so regarded if the shares represent participation in the assets of corporations which are managed so intelligently that permanently successful operation is virtually certain.

Notes on Molding Sand

Bulletin 266 of the U. S. Bureau of Mines ("Technology and Uses of Silica and Sand," by W. M. Weigel), includes a brief account of the properties of molding sand, a list of its principal sources, and a description of the quarrying, grading and washing methods used. Numerous footnotes referring to special writings on different phases of the subject are included. Other varieties of quartz used in the metal industries for furnace fettling, flux, grinding and polishing are given similar treatment. The bulletin may be secured from the Superintendent of Documents, Washington, for 40c.

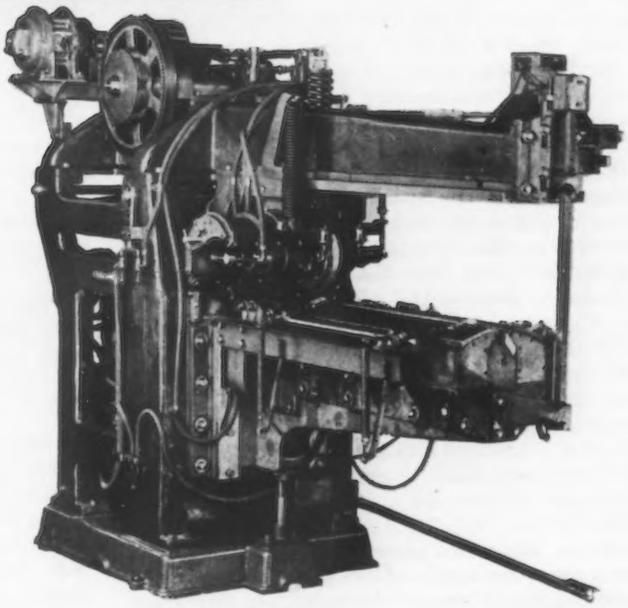


Multiple Spot Welder for Making Fireproof Doors

A CORRUGATED reinforcing sheet is joined to an outside cover sheet in a number of places. This machine has 17 pairs of welding electrodes and nine transformers, to ensure adequate current to weld each spot. Sheets are gripped by feed rollers and driven forward in steps by a Geneva drive; at each halt the electrodes are lowered by cam motion, current is switched on, and a row of spots is welded simultaneously. A second set of driven rollers discharges the finished work. Capacity, 64 operations per minute, each making up to 17 welds, or 1088 welds per minute. (Agnew Electric Welder Co., Milford, Mich.)

Welder for Side Seams on Steel Barrels

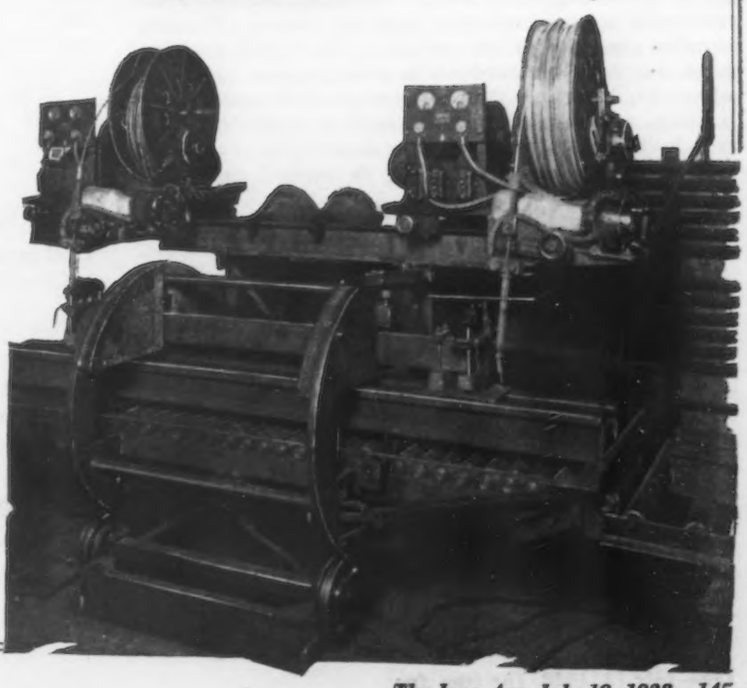
BENT sheets, up to No. 16 gage and 36 in. long, are placed on the lower horn and held down by magnetic clamps. The traveling roller die then moves over the seam at 20 ft. per min. Uniform current, notwithstanding the variable location of the roller die, is secured automatically by patented secondary lead construction and auxiliary choke. Heat is varied to conform to different thicknesses of metal and surface conditions by five transformer taps, change in roller speed (driven by rack and pinion through a Reeves variable speed drive), and change in tension of the pressure spring. Lower welding die is a ½-in. hard drawn copper bar, which can be filed and adjusted without removal. Roller die can be removed for dressing by loosening six cap screws. Dressing is necessary once a day, or after 3000 ft. of welds. (Thomson Electric Welding Co., Lynn, Mass.)



* * *

Machine for Making Railroad Ties Out of Scrap Rails

TIE plates are adjusted to exact position by jig and pneumatic clamp, and angle bars are held at ends with spring toggle clamps. Entire jig is rotated 45 deg. forward, and the far edges of the tie plates are welded to the rail tops by the two automatic heads; they are then rotated backward and the near edges are welded. The angle bars are welded on by hand-operated arc. Capacity, one tie every 5 min., using two workmen, a 1500-amp. motor-generator set with four welding circuits, and approach and delivery conveyors. (General Electric Co., Schenectady, N. Y.)



Passes for Hot-Metal Rolling

Calculations for Reduction of Height and of Area, Combined with Increase in Width, of Section Produced

BY H. A. SLATTENGREN*

IT is the purpose of hot rolling, generally, to reduce the cross-sectional area of the ingot or billet, and also in most cases at the same time to break up the crystalline structure of the ingot or billet and to refine the grain—in other words, "to make the metal." This can be accomplished by means of various forms of passes, the choice depending upon how fast the metal can be worked. This consideration includes the size of the ingot or billet and the characteristics of the particular metal, and also upon what shape of product is desired.

We shall here discuss mainly the shapes and sizes of the various grooves which make up the passes used in hot rolling, and what relation they bear to each other. The ratio of reduction in height, and resulting reduction of area, is a certain measure of the efficiency of a pass, and this we shall use.

Material, size and speed of the rolls have certain and definite influences upon the behavior of the metal in the various forms of passes, and must be taken into consideration for accurate results. The larger roll forms the metal more gradually and with less shock, other things being equal, but tends to increase the spread (sideways), while an increase of speed increases the stretch (forward), which is in favor of efficiency.

However, the above effects are generally small enough to be within the limits of the adjustment provided by the space between the rolls, which should always be made as small as possible, consistent with the economical life of the pass. This life depends upon the amount of metal that can be passed through it before the grooves are worn so much that the rolls touch or "ride," and cause the product to become oversize for subsequent passes.

Of course, the temperature of the ingot or billet generally determines the softness of the metal, and this is the main point of consideration in designing grooves. The comparative plasticity of the metals at the rolling temperatures, and not their hardness or other physical properties when cold, determines the relative sizes of the passes. For instance, a high-cobalt magnet steel at 2100 deg. Fahr. may be just as soft as pure iron at 1000 deg. Fahr., and would accordingly behave similarly in identical passes.

Shapes of Grooves

Rectangle into Rectangle—Plain Rolls

IF a 1-in. square of some metal at the right rolling temperature is passed between plain rolls set to give a reduction in height of 50 per cent, the height of the produced rectangle with rounded ends will be 0.5 in. The displaced area will be, of course, the same; some of this will spread sideways and some will stretch forward and disappear from the cross-sectional area. As this disappearance of area will be equal to the difference between the area of the original square and that of the product, it can be more or less readily determined by experiment, about which more later. The percentage of reduction of area is found from the area which stretches forward, divided by the original area.

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Let *Rh* equal the ratio of reduction in height; *Ra*, the ratio of reduction of area; *Wo*, the width of the original; and *Wp*, the width of the product. Then the general formulas for rectangle into rectangle, through plain rolls, are:

$$Wp = \frac{(1-Ra)\ Wo}{(1-Rh)} \quad \ldots(1) \quad \text{and} \quad Ra = 1-\frac{(1-Rh)\ Wp}{Wo} \quad \ldots\ (2)$$

It can be readily seen that *Wp* increases with *Wo* and *Rh*, but of course decreases as *Ra* increases. Similarly, *Ra* increases with *Wo* and *Rh*, but decreases as *Wp* increases. As an example, let us say that *Rh* is 40 per cent; *Ra* is 20 per cent and that *Wo* is equal to 3 in. Then, substituting in equation (1), we have:

$$Wp = \frac{(1-0.2)\times 3}{(1-0.4)} = \frac{0.8\times 3}{0.6} = \frac{2.4}{0.6} = 4 \text{ in.}$$

If *Ra* is not known, by using *Wp* as above in equation (2) we get:

$$Ra = 1-\frac{(1-04)\times 4}{3} = 1-\frac{0.6\times 4}{3} = 1-\frac{2.4}{3} = 1-0.8 = 0.2 = 20 \text{ per cent}$$

This holds good very closely for any rectangle through plain rolls, after making a small allowance for the convex sides of the product, which is a comparatively easy matter to do.

Square Into Oval (Ellipse)

Pass a 1-in. square into an oval pass 0.5 in. high, which makes *Rh* equal to 50 per cent. The displaced area in this case will be somewhat more than 0.5 square inch. Because of the shape of an ellipse, the stretch will be more than it is for plain rolls, if the other factors are equal. It is well to note that the oval groove is always cut into the roll with a round tool which makes its outline an arc of a circle, but the discrepancy from that of an ellipse is so slight as to be negligible for our purpose. The area of an ellipse is equal to 3.1416 times the product of its half-axes.

If we again let *Wp* equal the width of the oval, the other symbols remaining the same, we get:

$$Wp = \frac{(1-Ra)\ Wo}{0.7854\ (1-Rh)} \quad \ldots\ (3) \text{ and}$$

$$Ra = 1-\frac{(1-Rh)\times 0.7854\ Wp}{Wo} \quad \ldots\ (4)$$

Oval into Square or Diamond (Rhombus), with Major Axis of Oval Coinciding with Diagonal of Square or Diamond

$$Wp = \frac{(1-Ra)\times 1.5708\ Wo}{1-Rh} \quad \ldots\ (5) \qquad \text{and}$$

$$Ra = 1-\frac{(1-Rh)\ Wp}{1.5708\ Wo} \quad \ldots\ (6)$$

Side of square equals 0.70711 Wp; and the area of a diamond or rhombus equals one-half of the product of its diagonals.

Square into Diamond—Side of Square Parallel to Diagonal of Diamond

$$Wp = \frac{(1-Ra)\times 2\ Wo}{(1-Rh)} \quad \ldots\ (7) \qquad \text{and}$$

$$Ra = 1-\frac{(1-Rh)\ Wp}{2\ Wo} \quad \ldots\ (8)$$

Diamond into Diamond—Diagonals Coinciding

$$Wp = \frac{(1-Ra)\ Wo}{(1-Rh)} \quad \ldots\ldots(9) \qquad \text{and}$$

$$Ra = 1 - \frac{(1-Rh)\ Wp}{Wo} \quad \ldots\ldots\ldots(10)$$

Oval into Round

$$\text{Diameter of Round} = \frac{(1-Ra) \times 0.7854\ Wo}{(1-Rh) \times 0.7854} \ldots.(11) \qquad \text{and}$$

$$Ra = 1 - \frac{(1-Rh)\ D}{Wo} \quad \ldots\ldots\ldots(12)$$

Diameter of round—*D*—here corresponds to *Wp* in above equations.

Essential Information

WHEN designing a pass it is first of all necessary to decide upon the amount of *Rh* desired. This is governed by (1) the strength of the rolls; (2) the gripping angle, which is usually about 30 deg. from the vertical axis of the roll; and also (3) by the amount of reduction which the particular metal will endure without damage. Metal in the ingot form generally requires careful and easy rolling until its structure is sufficiently refined for the higher reductions. After this, reductions in height up to 50 per cent may be used with safety. It is in the interest of efficiency and economy, of course, to "hit the work" just as hard as it will stand, because, as shown by above equations, *Ra* always increases with *Rh* if other things are equal.

We may decide to use the same *Rh* throughout. But if we desire to keep the ratio of width to thickness of the oval more or less uniform, it will be necessary to decrease *Rh* as the billet gets smaller and cooler—in other words, when the spread sideways increases. It seems to be an invariable rule that the harder the metal is, at time of rolling, the more it spreads sideways, and vice-versa.

For convenience in illustrating, let us assume *Rh* to be 50 per cent throughout. Theoretically, *Ra* does not vary with the size of billet under the same *Rh* and shape of pass. But it does in practice, due to differences in rate of cooling and to the fact that the size of rolls is not changed proportionately.

Determining Ra and Wp

To proceed, we get sample lengths of the metal to be rolled in the following sizes of squares: 0.25 in., 0.5 in., 1 in., 2 in., 3 in., 4 in. and as many more as required, depending upon the sizes to be rolled. These are passed at an *Rh* of 50 per cent (as decided upon above) between plain rolls of a material, size and speed corresponding to what the actual rolling conditions will be.

From the round-ended rectangles produced, it is easy to compute the amount of *Ra* for the different sizes. They may be plotted on suitable cross-section paper, so that the *Ra* for intermediate sizes may be found from the curve. This done, *Wp* may be computed also for any size of rectangle into rectangle, and a curve again plotted for convenience, if desired, which may be checked by scaling the width of the rectangles rolled as above.

We know now the *Ra* and *Wp* for any size, within the range, of rectangle into rectangle for the metal in question. Let us compare the equations from above:

$$Wp = \frac{(1-Ra)\ Wo}{(1-Rh)} \ldots.(1) \text{ and } Ra = 1 - \frac{(1-Rh)\ Wp}{Wo} \ldots.(2) \text{ Rectangle into Rectangle.}$$

$$Wp = \frac{(1-Ra)\ Wo}{0.7854\ (1-Rh)} \ldots.(3) \text{ and } Ra = 1 - \frac{(1-Rh) \times 0.7854\ Wp}{Wo} \ldots.(4) \text{ Square into Oval.}$$

$$Wp = \frac{(1-Ra) \times 1.5708\ Wo}{(1-Rh)} \ldots.(5) \text{ and } Ra = 1 - \frac{(1-Rh)\ Wp}{1.5708\ Wo} \ldots.(6) \text{ Oval into Square or Diamond.}$$

$$Wp = \frac{(1-Ra) \times 2Wo}{(1-Rh)} \ldots.(7) \text{ and } Ra = 1 - \frac{(1-Rh)\ Wp}{2\ Wo} \ldots.(8) \text{ Square into Diamond}$$

$$Wp = \frac{(1-Ra)\ Wo}{(1-Rh)} \ldots.(9) \text{ and } Ra = 1 - \frac{(1-Rh)\ Wp}{Wo} \ldots.(10) \text{ Diamond into Diamond.}$$

$$\text{Diameter of Round} = \frac{(1-Ra)\ Wo}{(1-Rh)} \ldots.(11) \text{ and } Ra = 1 - \frac{(1-Rh)\ D}{Wo} \ldots.(12) \text{ Oval into Round.}$$

Taking equation (1) as a basis for comparisons, it is seen that the *Wp* for equation (3) is $\frac{1}{0.7854}$ or 1.273 times the size of *Wp* for equation (1). Similarly, *Wp* in (5) is 1.5708 times the *Wp* in (1); the *Wp* in (7) is twice that of *Wp* in (1). The *Wp* in both (9) and (11) are the same as *Wp* in (1). The above is true only when *Rh*, *Ra* and *Wo* are the same in all cases, an unlikely condition, so the comparison is cited only for general information.

However, with the *Ra* it is possible to draw a considerably more definite relation between the different shapes of passes. For instance, it is plain that the *Ra* in equation (4) is larger than *Ra* in (2) for the same *Rh* and *Wo*. However, the numerical relation is not so simple to arrive at. For instance, if we divide (4) by (2), we get:

$$\frac{(1-0.7854)\ Wp}{(1-Wp)} = \frac{0.2146\ Wp}{(1-Wp)}$$

This for our practical purpose does not mean so much. But it is possible to arrive at a comparative value by means of a direct example, as follows: Let *Rh* equal 50 per cent, *Wo* equal 1 and *Wp* equal 1.5 in equation (2). Substituting, we get:

$$Ra = 1 - \frac{(1-0.5) \times 1.5}{1} = 1 - (0.5 \times 1.5) = 1 - 0.75 = 0.25 = 25 \text{ per cent.}$$

For the same values in equation (4):

$$Ra = 1 - \frac{(1-0.5) \times 1.5 \times 0.7854}{1} = 1 - (0.5 \times 1.178) = 1 - 0.589 = 0.411 = 41.1 \text{ per cent.}$$

It is both interesting and instructive to draw comparisons between *Wp* and *Ra* for the different equations. But when we try to arrive at a direct relation, we find them so cumbersome that they have little practical value to roll pass designers. Several attempts have been made to make graphical comparisons and to evolve formulas, and with some success. The following is an equation which is supposed to apply only to steel, but will hold good for any metal with the same softness and characteristics as steel at the rolling temperature. It is of European origin, I believe:

$$B = 1.93C - 0.465H,$$

where *B* equals the width of the oval; *C* equals the side of square and *H* equals the height of the oval, which must be assumed according to the amount of reduction desired. A formula is not necessary to get the dimensions of the new square, as these can be determined by the ratio of reduction. There is little danger that the square will become overfilled, but if the smallest possible square is used, it is safer to make the angles of the square grooves from 91 deg. to 94 deg., to prevent forming a seam along the bar.

A process of manufacturing chromium plate has been placed on a commercial basis by the Apollo Metal Works, La Salle, Ill. It is offered as Apollo Chrome, "in sheets available for immediate fabrication without plating."

Cupola Operations Are Changing

Cooling of Reduction Zone Expected to Improve Thermal Economy—Desulphurizing by Alkaline Slags

IMPROVEMENTS in cupola practice, principally of a thermotechnical nature, are attained by replacing coke with other fuels, chiefly in liquid or powdered form, by cutting down the formation of carbon monoxide in the reduction zone by a secondary air combustion of this gas, and by heating the air blast. Metallurgical improvements which are sought in the operation of cupolas are directed toward a reduction in the accumulation of sulphur and the production of a high-grade low-carbon and highly superheated cast iron.

The replacement of coke by other solid, liquid or gaseous fuels does not offer any advantage either from a technical or from an economical point of view. On the other hand, satisfactory operating results have been attained by the use of auxiliary oil firing, which, however, is uneconomical because of the high price of fuel oil. Similar advantages have been obtained with auxiliary pulverized coal firing, such as has been employed since 1921 at the Babcock works in Oberhausen.

Effect of Cooling Reduction Zone

The problem of diminishing the formation of carbon monoxide in the reduction zone, which is extremely detrimental to the thermal economy of the cupola, led to the introduction of a secondary air supply, but without obtaining satisfactory results. On the other hand, the method of Corsalli, which consists of making the coke more difficult to burn by drenching it with slacked lime, seems to offer some advantages. A question of great interest, from the theoretical as well as from the practical point of view, is whether it is possible to effect any physical or chemical reactions through a cooling of the reduction zone, which will make for thermal economy in operating the cupola. Attempts have been made to bring about such a cooling through the blowing in of cooled waste gases by a spray of steam or of water, or by strongly dampening the coke charges.

Water Spray Lowers Coke Consumption

The introduction of a water spray is favored by the Vulkan-Feuerungs A.G. in Cologne, which is said to have brought about a considerable reduction in coke charge consumption in the case of cupolas for continuous operation. After it had become evident that combustion of the carbon monoxide in the reduction zone by introducing a secondary air supply was not practicable, Greiner and Erpf in 1885 attempted, with good results, to bring about such combustion in the preheating zone of the cupola. The method of Greiner and Erpf has worked well but has required extremely high furnaces, which are seldom practicable on account of the lack of space in foundry buildings. The Poumay cupola, which originated in Belgium, is an improvement on this type. Data available on the operating results, however, do not warrant a conclusive opinion on the merits of the process.

Schuermann Cupola Passing Out

The most interesting cupola of special design is the Schuermann furnace, which made its appearance in 1922. [THE IRON AGE, Oct. 19, 1922, and Nov. 22, 1923.] In this type, part of the combustion gases is taken directly from the combustion zone and the reduction zone respectively and utilized for the heating of the air blast by means of air heaters. The majority of the Schuermann cupolas that were in operation from 1922 to 1925 had been erected in plants which were cramped for space, and did not come up to expectations. In isolated instances, it is said, they have given a good account of themselves. In every case, however, these cupolas permit the use of cheaper grades of metal and a certain saving in coke; neither of these advantages is sufficiently important as yet to warrant the additional expense of this furnace equipment in the smaller foundries. The Schuermann cupola at the outset, before a familiarity with its construction had been acquired, was largely overestimated. At the present time, when it is possible to obtain excellent standard equipment and to operate it successfully, the Schuermann cupola is no longer seriously considered.

Alkaline Slags Are Strong Desulphurizers

Walter has focussed attention on the strong desulphurizing action of pure alkaline slags. The Walter desulphurizing method was at first carried out in crane pots or in special desulphurizing hearths. However, it was difficult and inconvenient, and at times even impossible, to desulphurize in this manner. Later, however, it was found possible, first to separate the fluid cast iron from its acid fusion slag upon its discharge from the cupola, and then to desulphurize it in the forehearth by means of a pure alkaline slag. Of the different designs of equipment used to make such a separation of the cast iron and the slag, those of Luyken, von Rein and of the Freier Grunder Eisen und Metallwerken deserve especial attention.

Characteristics of High-Test Iron

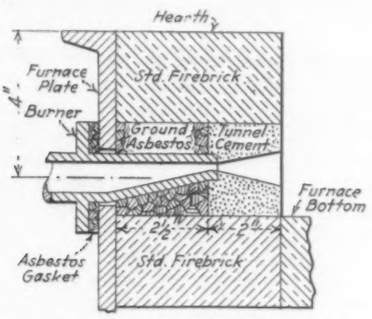
The endeavor to produce a so-called high-test cast iron in the cupola is of especial interest. The characteristics of this product are a low-carbon content and a fine and uniform distribution of the graphite flakes, which can be attained only by strongly superheating the iron. The production of such iron in the cupola is feasible only with the addition of large quantities of steel and with the maintenance of a powerful blast and a very high combustion zone. Following this method, it is difficult to obtain a uniform product in the cupola. The electric furnace, not the cupola, is the proper equipment for the production of a really high-test cast iron.

On a report that the materials for locomotive boilers, fire boxes and plates in connection with orders placed in Europe by railroads of South Africa must be supplied according to American standard specifications, the French publication *L'Usine* adds to the surprise expressed by the *Iron and Coal Trade Review*, of London, that such a requirement is the case. The British publication held that British steel works could produce plates of equal quality and the Paris publication adds that European steel plants are capable of producing material corresponding to the American specifications. The information of the European papers is that the plates had to come from any of seven American plants designated by the High Commission of the South African Union.

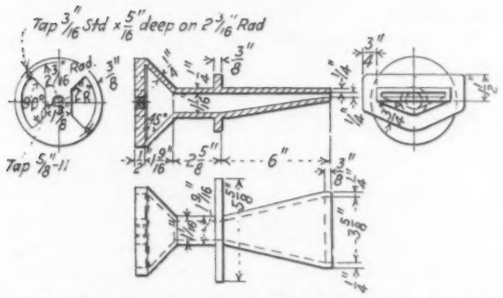
Standard Units for Forging Furnaces

Various Sizes Quickly Assembled at McCormick Works of International Harvester Co.—Use Gas Burners

IN the matter of heating furnaces for forging work, the McCormick works of the International Harvester Co., Chicago, has adopted a standard unit. From a few sizes of bed, side and end plates, furnaces of varying internal dimensions may be built up quickly. The unit design was made in accordance with the dimensions of standard refractory brick, and the whole is held together with tie rod construction. Arches are 9 in. deep and made up in sections clamped together in the conventional manner. The roof of a furnace is easily removed by simply lifting out these sections one at a time.



High Pressure Gas Burner Setting for Small Burner. The firebrick wall with the larger burner is 9 in. thick, against 4½ in., as here shown



The Smaller Burner Is Built Along Lines of This, the Larger, Burner. Its orifice is 3 x 3/16 in.

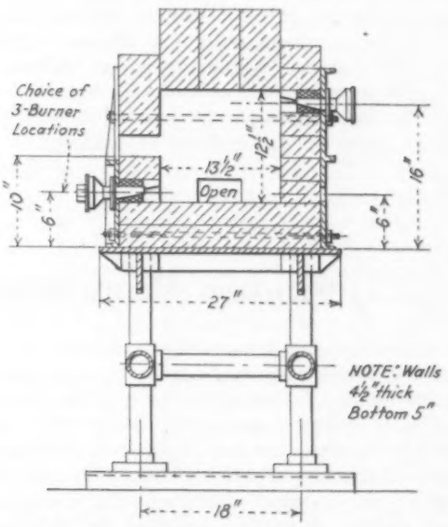
The individual furnaces are mounted on standards constructed of pipe with cross members for stiffening the legs. There is a clearance of 12 in. between the floor and these cross members so that the furnaces may be handled with standard elevating trucks. This not only promotes flexibility in layout, but also permits the removal of a furnace and the substitution of another in the minimum of time.

Some details of the furnaces, accompanied by drawings here reproduced in part, were obtained from J. B. Nealey of the American Gas Association. In substance they are as follows:

In this line of furnaces there are only two hearth widths, 30 and 40 in. respectively, while four depths are included, namely, 9, 13½, 18 and 27 in. The heights of the furnace walls are regulated to maintain a certain ratio of gas consumption with combustion chamber area.

The furnace walls are 4½ in. thick and are not insulated. In front of each furnace a hood is provided which reaches down almost to the top of the opening through which the work is charged. Just below this opening is a long pipe running parallel to it with a series of holes in the top side. Air is blown through these holes and forces the escaping heat up under the hood, thus to provide good working conditions.

The burner design is an adaptation of the venturi inspirator principle whereby the high-pressure gas induces the flow of air for its combustion. Desired ratios of gas and air can be obtained and maintained continuously by simply adjusting a shutter, for reducing, neutral or oxidizing furnace atmospheres.



Typical Furnace May Be Carried by Truck When New Location Is Desired

A feature of this design is the burner port which, instead of being round, is flat, to create a fanlike sheet of flame. These burners were designed for manufactured gas of 535 B.t.u. and specific gravity of 0.48 to 0.50. For perfect combustion this gas requires 4½ cu. ft. of air, which the burners will readily handle.

The flat tip or slotted orifice at the discharge end of the burner throws the gas-air mixture in a thin sheet over the furnace refractories. The idea was to increase the width of the flame and reduce its length so that the size of the combustion chamber could be decreased. The most efficient forge furnace has a combustion chamber so reduced in size in proportion to the size of the work that the latter will be as near the refractories as possible, to obtain the maximum of heat absorption. As flame impingement is not desirable for some work this distance is partly controlled by the length of the flame. The refractories on all six sides of the work are brought up to incandescence.

These burners are cast with the inspirator as an integral part. The number of burners to a furnace is controlled by the size of the burners, the internal dimensions of the furnace and the temperatures desired. While these burners normally operate with gas at 15 lb. pressure, they can be turned down to as low as 1 lb. The arrangement depends upon the class of work and they fire from the

front, ends, above, below or any combination of these as necessary. Manifolds into which the burners are screwed are clamped to the walls of the furnaces, allowing for quick removal and replacement. The gas is piped direct to the manifolds which supply it to the burners.

There are two sizes of burners, one with a slotted opening 3 in. long and 3/16 in. wide and the other 3⅝ in. long and ¼ in. wide. The first is 6 7/16 in. long and the latter 10 15/16 in. in length. Brass spuds of three drillings, 44, 42 and 32, are used.

With gas at 12 lb. the larger burner will consume 160 cu. ft. of gas an hour with No. 44 spud, 260 cu. ft. with No. 42 and 340 cu. ft. with No. 32 spud. With the same pressure the gas consumption of the smaller burner is 70 cu. ft. an hour with a No. 44 spud, 110 cu. ft. with a No. 42 and 175 cu. ft. with a No. 32 spud. Burners are apportioned to the various sizes of furnaces in accordance with a predetermined ratio. This ratio is based upon a rate of gas consumption of 660 cu. ft. an hour for 1 cu. ft. of combustion chamber volume.

In the design of the burners precautions against overheating were taken by the following means: (1) insulation around burner in the form of ground asbestos, (2) large throat diameter compared with size of spud orifice, (3) smallness of end area of burner presented to heat of furnace, (4) minimum amount of metal in burner to retain heat, and (5) no change in flow of gases after leaving orifice, which permits a faster flame propagation.

The average life of the furnace hearths in this plant is only four months when used in conjunction with hammers, bulldozers, benders, upsetters, etc., while the walls and arch will stand up for a year at least. On high-temperatures high-production work hearth changes may be necessary as frequently as every few days, due to the limitations of the refractories.

In order to heat the stock to 1800 deg. Fahr. with the requisite speed it has been found that the hearth must be carried at 2200 deg., giving the furnace a thermal head of 400 deg. This gives heat penetration at the rate of ⅛ in. per min., which means that stock 1 in. in diameter or thickness requires 4 min. to be brought up to temperature. In order to determine the time element in bringing larger stock up to forging temperature, add approximately 25 per cent more time for each additional ½ in. in diameter or thickness. The gas at the time it is received at this plant is under a pressure of 4 lb., but is raised to 15 lb. in two compressors, each of which has a capacity of 2000 cu. ft. per min.

There are two forge shops at the McCormick plant, one 60 x 450 ft. for making bolts and nuts, and the other 90 x 650 ft. for miscellaneous forgings. In this latter shop are located approximately 125 forges and about the same number of upsetters, bulldozers, Bradley hammers, drop hammers, benders, etc. The other forge shop contains 54 forge furnaces and about the same number of hot press bolt headers and nut machines.

Germany Promoting Greater Use of Aluminum

THE recent .inum price reduction in Germany of £10 per ton l. :n interpreted unofficially, says the United States Depa nt of Commerce, as a move intended to promote a more extensive use of the metal. The European Aluminum Cartel, which has been in existence for more than a year and a half, was apparently organized primarily for that purpose. It is stated that the cartel would welcome even more radical downward revisions in the American prices, since they would mean a more rapid popularization of the metal. Further comment by the Department of Commerce in its "Foreign Trade Notes" is as follows:

"The recent action of the cartel coincided with the action of the International Copper Cartel effecting another advance in copper prices. Germany's interest in eliminating copper from its chief industrial applications for the sake of national self-sufficiency gives significance to the contrast in the price behavior of the two metals.

"It was expected that the price reduction on aluminum would affect only wire bars. It appears, however, to concern H-bars and blocks, while the only advantage gained by wire bars in competition with copper is in the advance of copper prices. The interest in electrical applications of aluminum is more pronounced in Germany than in other European countries. The latter are perhaps more interested in aluminum's chances to compete with steel and brass, especially in the form of aluminum alloys, on which extensive research and experiments are being conducted in all aluminum producing countries.

"The statement that the European cartel would welcome another price cut on the part of American producers is not without reservations, as it is stated that an immediate cut would not be desirable. Any sudden action with respect to prices might prove embarrassing at present to certain European countries whose output exceeds the domestic consumption to an extent making it imperative to preserve export markets. Germany appears to be in a position to view any such developments without apprehension, since its own domestic market takes care of the entire domestic production. Concern is expressed on behalf of France, whose aluminum exports to the United States are of some importance. It is feared that the high import duty and cost of transportation might easily counterbalance such uncertain advantage as the lower prices of the French product, even though the American prices may never go as low as the European.

"It is stated that the German production of aluminum is much greater than is generally believed. The popular error that the recent price cut was due to the employment of the more economical Hagelund process has been explained by German authorities. It appears that the Hagelund process is not yet used to an extent to influence European prices. An experimental plant at Lautawerk is equipped on a comparatively large scale, but the only plant designed to use the process on a commercial basis is now under construction near Venice. There are also experimental plants in several other countries."

"An Investigation of Web Stresses in Reinforced Concrete Beams" is the subject of a 106-page bulletin, No. 166, of the Engineering Experiment Station of the University of Illinois, the price of which is 60c. Illustrations show graphically how beams fail under varying conditions of load. Tests were made with several types of reinforcing and with both concentrated and distributed loads. The author is Frank A. Richart, assistant professor of mechanics.

"Modern Methods in an Old Industry" is the title of a handsome booklet of 28 pages issued by the Belle City Malleable Iron Co., Racine, Wis. It shows how the company doubled its capacity to meet growing demands. Photographic illustrations are numerous, running all the way from action views in the plant to photomicrographs taken from some of the product. An electric furnace in the steel castings department comes in for its share of attention.

BOOK REVIEWS

Relation of Safety and Production

Safety and Production. Report by the American Engineering Council. Pages, 414, 6 x 9¼ in.; 283 charts, 31 tables. Published by Harper & Brothers, New York. Price, $5.

The Manual of Industrial Safety. By Sidney J. Williams, C. E. Pages, 197, 5½ x 8 in. Published by the A. W. Shaw Co., Chicago. Price, $2.50.

The inquiry, the subject of the first book, was intended to cover the following points: If industrial accidents under the conditions of increased production occasion increased frequency and severity, are these latter increases, if any, in greater or less proportion than that in production? If industrial accidents can be controlled under modern production conditions; how does safety interfere with production? If positive correlation exists between safety performance and efficiency of production, is the safety factor the efficient one? If safety is an executive responsibility, and if the key to the safety movement is executive, what degree of improvement can be attained in safety performance, and what reduction can be expected in the costs of industrial accidents?

The difficulty in making the investigation and in drawing conclusions therefrom lies in the fact that both production and safety are the integration of so many factors. But it has been possible to base the investigation on statistics, as average number of employees and of man-hours, annual production, and number of lost-time accidents per year, and number of days lost due thereto.

Three levels of performance have been considered: A high one, where production rate increased and the accident frequency rate decreased in 60 per cent or more of the year-to-year changes; a lower level, where the contrary was the case; and all the cases considered together as forming a mean-level group.

The question of cost of accidents is considered only accidentally, although costs are a factor in any accident experience; but this matter is taken up in a section devoted to individual accidents.

As a result of the findings we have:

1.—Industrial accidents can be controlled under modern conditions of highly efficient production; the rate of change in production per man-hour is greater than the rate of change in accident frequency or that in accident severity per man-hour. (Quantitatively, the production rate increased 14.4 per cent in three years while the accident frequency rate was 10.4 per cent lower and the accident severity rate 5 per cent higher.

2.—Wide experience shows that material reductions in accident rates can be had with greater production.

3.—Major executives are as much bound to initiate accident prevention as to effect greater production.

4.—Efforts to improve safety performance do not interfere with production.

5.—Ordinarily, greatest production comes only where accidents tend to the irreducible minimum.

6.—Tremendous improvements can be attained in production and accident prevention.

7.—Cost of industrial accidents must not be left unconsidered.

8.—Organized safety work is found in but few industrial plants.

9.—Many industrial establishments keep no accident records, and make no attempt to analyze their experience as the first step in reducing accidents.

As might be expected from this committee, it does not stop with statistics and conclusions, but goes on to make recommendations. These may be briefly stated as: (1) Giving the same executive direction and control to decreasing accidents as to increasing production. (2) Adoption of a uniform terminology. (3) Those plants that have proportionately high accident rates should try to get down to the same rate as those having few and minor accidents. (4) Associations should impress on their members the necessity of cutting down the accident rates. (5) Associations should compile and analyze statistics, in order to determine the lowest accident rate possible in each industry. (6) Associations should influence their executives in their industry to get the lowest possible accident rate for each industry.

The various "graphs" in this interesting and useful volume show that by-product coke ovens, foundries, cement works, electric light and power plants, electric railroads, manufactories of explosives, lumber plants, paper, pulp and paper-products works, sheet-metal plants, and steam railroads (both freight and passenger), telephone and telegraph service, furniture factories, machine works, metal-working plants, mining concerns and quarries, bee-hive coke plants and the manufacture of boots and shoes, and of gas, the frequency and severity of accidents decreased at the same time as increased production. In men's clothing, and in the brass, bronze and copper products industries, the frequency increased slightly more rapidly than the production, but the severity decreased. In the automobile industry and in the manufacture of fine machinery and the production of forgings and that of valves and fittings, in making writing paper and wood products, and in textile manufacture, the severity increased very slightly more than the production, the frequency rate a trifle less rapidly. In bituminous coal mining the fatality rate increased slightly more rapidly than the production rate.

As might be expected from a report by the American Engineering Council, the work is a credit to its authors and to the publishers. The table of contents is clear and the alphabetical index full and satisfactory.

There have been a good many and a good many kinds of researches and experiments in industrial safety, by manufacturers, railroad managers and others, but until comparatively recently the practical results of their findings have not been collated and placed within the reach of those who are, or should be, interested. The volume by Mr. Williams, while not at all exhausting the subject, is a step in this direction.

It shows that the most desirable results of the movements and experiments in the direction of securing safety for industrial employees—and machinery and equipment—have been attained by cooperation rather than by authority or enforcement. The safety committee is emphasized as the mainstay of the "safety man"; but the importance of the foreman's attitude is pointed out. Inspections and reports of the safety committee are accorded due value.

Meetings for the consideration of the safety campaign are described and the functions and advantages of publicity by bulletin board, printed or other posters, serious or humorous.

Also included are company magazine, and premiums, bonuses and temporary signs. There is a rather good description of campaigns, competitions, and rewards; and the question of records is handled quite satisfactorily—for instance as to what records should be reported and tabulated, and the use of frequency and severity rates; the employment of statistics for the safety committee and the workmen is pointed out as desirable.

A special chapter is devoted to the fundamentals of

machine guarding and the matter of quick-stop devices, and to the danger caused by slippery floors. The safe guarding of the plant equipment by railroads, and construction and use of safety ladders and scaffoldings, is the theme of another chapter, in which, also, we find such topics as grinding-wheels, gas and electric welding and cutting, and the control of hand tools.

The effect of safety on morale is considered. An entire chapter is given up to fire prevention and protection, and of course it is necessary to go into the question of public accidents, such as those to trespassers and passers-by, to passengers or customers, and to employees in public places. Taking it by and large, this book should be in the hands of every foreman and department head in industrial service.

ROBERT GRIMSHAW.

Abrasives and Grinding

The Abrasive Handbook. By Fred B. Jacobs. Pages 547, 6 x 9 in., numerous illustrations and several tables. Published by the Penton Publishing Co., Cleveland. Price, $5.

This compilation should be very useful to machine shops, in that it gives the results of the combined experience of many well known manufacturers and users of abrasive materials and grinding machines and appliances. Its arrangement differs from that of most technical works in that under each section—for instance, cylindrical grinding, or honing practice—the items ars arranged alphabetically.

There is an immense amount of data covering machines, materials, and methods of practice obtained from about a hundred firms and individuals, to whom credit is given in a general way in an alphabetical list of contributors, although very often there is no means of knowing which of these is responsible for any particular chapter or statement.

As principal section heads or topics we find a description of the various abrasive materials, cylindrical and disk grinding machines, grinding wheels and practice, and honing practice, miscellaneous abrasive data, operations, polishing and buffing, and safe operation of wheels.

Management Matters Common to All Industrial Enterprises

Management in the Factory. By Glenn Lion Gardiner. Pages 225, 4¾ x 7¾ in. Published by the McGraw-Hill Book Co., New York. Price, $2.

This work intends "to present an elementary consideration of the divisions and functions of management which are common to practically all industrial enterprises." This alone is no mean task; and by reason of the fact that production and inspection methods in every plant are more or less peculiar thereto, the author very wisely omits consideration thereof; and maintenance is left out, because it would require a volume in itself.

Passing over a general chapter on forms of industrial organization, we come unexpectedly to the importance of the sales department and the methods of selling. In this the organization and assignment of territory are well handled, but under the head of bonuses, the author might have mentioned the great failure of that system of remuneration of salesmen. Often after the bonuses have been accorded (say in January) for the amount of sales, returns are likely to come in in alarming quantities, where customers have been overloaded, perhaps with goods requiring checking, relabeling, etc.

The place of the purchasing department in the organization is laid down; but I do not agree with the author that the purchasing for a foundry, for instance, is simple. And sufficient attention is not paid to the matter of foresight as regards the possible trend of the market. Under "Stores" a little more attention might have been given to the importance of balancing the stock.

The chapter on traffic is admirably handled; that on welfare service well, although with a tinge of idealism. Under accounting sufficient attention is not paid to cost accounting, particularly that branch that predetermines production cost, and more especially its application to cost reduction.

The undoubted advantages of teamwork are given a special chapter, but in this the author states that there are only three factors in production—man, materials and equipment; whereas no business could get along without consideration of three others—a market to supply, money to start and run the business, and, above all, management; the omission of the latter being rather unexpected in a work on that topic.

To each chapter there is a short questionnaire. A good table of contents and an alphabetical index enhance the value of the book.

ROBERT GRIMSHAW.

Procedure in Taking Out a Patent

Patent Essentials. For the Executive, Engineer, Lawyer and Inventor. By John F. Robb. Pages 485, 5⅝ x 8⅜ in.; illustrations, 19. Published by Funk & Wagnalls Co., New York. Price, $5.

In this inventive age and country everyone is directly or indirectly interested in the subject of patents; and a larger proportion of our people are actual or potential inventors than in any other land. Hence even to the layman —meaning him or her who is not a patent lawyer—a work treating of those matters concerning the law and practice before the United States Patent Office, that are essential for the executive, engineer, lawyer and inventor, should be of great value, not merely to refer to in case of need, but to study in order to ward off possible trouble in patent matters.

Mr. Robb and his associates have produced such a volume, of which this is the revised edition of the current year. The work, says the principal author, is intentionally rudimentary and practical, being intended to enable quick acquirement of a working knowledge about patents and things pertaining thereto. It is what I would call, coining an expression for the purpose, an "at elbow book," and is particularly valuable because it contains features hitherto lacking in any work on patents—namely, the treatment of the science of drafting patent claims, and complete illustrative cases, as well as complete forms rather than the mere skeletons usually given.

In the preface to this second edition the author pats himself on the back, probably with full justification, because the chapter on claims and their formulation had been especially well received, and many of the objections in the first edition, including changes in old law and practice that he had denounced, stand accomplished.

The first chapter is on the purpose and the personnel of our Patent Office, jurisdiction and procedure, the progress of an invention through the office (from application to patent) and brief definitions of patent terms; the second, on the utility of invention, patent infringement, the validity of patents, infringement, validity, and other investigations. This is followed by one on evaluation and depreciation, that patentees and intending patentees should study in order to save themselves much disappointment.

Chapter IV, a symposium by various members of that much abused class, patent examiners, covers invention and mechanical skill, combination vs. aggregation, mechanical processes and functional claims, practice relating to division, and new matter. Chapter V goes fully into details of the preparation of applications, clear through to the correction of drawings. Chapter VI divides and treats all patents as either accidental, abstract or complete, and considers claims as what they should be—word pictures.

The next chapter is very precise in its handling of the practical operation of important Patent Office rules; while

the eighth takes up that heart-breaking matter, appeals. The section on additional patents will open the eyes of many who think themselves covered by their claims. Other divisions of the book are devoted to assignments and contracts, interference, and in notable fullness, special forms of procedure, followed by a typical mechanical patent application as completely prosecuted, and a typical reissue patent application, file wrapper, contents and drawings, complete enough for the most meticulous.

The typography of the text is unusually clear; not so, that of the otherwise excellent index, which supplements the clearly laid down table of contents, and the table of 350 or so decisions cited.

It would seem impossible that a book on such broad lines, by a successful patent lawyer of nearly thirty years' experience in his specialty, aided by five patent examiners, would be other than both useful and reliable.

Savings Through Scientific Management in Swedish Iron Works

How a Swedish rolling mill employing over 1000 men was enabled to meet the problem of quick deliveries with a smaller force was described by Olaf Kaernekull, of Stockholm, to the Third International Congress of Scientific Management, held in Rome during September, and reported in *Engineer*, London.

By reorganizing the warehousing and shipping departments, the staff was reduced 27 per cent, notwithstanding an increase of 24 per cent in the volume of materials handled. In order to take care of the demand for quick deliveries, a budget of raw materials is prepared periodically based on the orders on the books. Actual consumption comes within 1 or 2 per cent of the budget. Metal stocks were reduced by 626 tons and economical use of material showed a saving during twelve months of 166 tons. All work was carefully planned, and the processes studied in detail with the aid of time studies. In the more complicated operations as many as 11,000 observations were made before the final working procedure was determined. The resulting control of the load on the machinery during different shifts and working days has reduced the number of workers employed in the rolling mills alone from 175 to 155 for the same output. In the tube works the output per man each week increased during the twelve months from 318 kilos. to 360 kilos.

Handbook of Labor Statistics

Many subjects of a wide variety of interest are comprised within the 828 pages of the "Handbook of Labor Statistics, 1924-1926," which has been issued as Bulletin No. 439 of the United States Bureau of Labor Statistics. Copies may be obtained at $1 each from the Superintendent of Documents, Government Printing Office, Washington. Much of the volume naturally is taken up with the question of employee relationships, apprenticeship, arbitration and conciliation, cooperative societies, employment statistics, industrial accidents, disease and poisons, insurance and benefits, labor organizations, legal aid, minimum wage, old age pensions, physical examinations, strikes and lockouts, unemployment insurance, vocational education, workmen's compensation, and the like.

Among the items of particular interest may be mentioned the occupational distribution of the population of the United States. This has been studied over a long period of years and changes are traced in some of the more important lines of activity. Turnover of labor for a number of industries has been studied, showing month by month changes over a period of years and an analysis of turnover among a large number of types of employment in December, 1926, and January, 1927.

Wages and hours of labor occupy more than one-eighth of the book. The subject is gone into in great detail, with index numbers of wages based on 1913 over a period of years, and for a large number of occupations, as one of the leading compilations. Hourly and weekly earnings are shown for many employees. In particular, there is a considerable study of wages and hours in the iron and steel industry, from 1913 to 1926 inclusive. Wholesale and retail prices are covered in one chapter of more than 30 pages.

Seamless Steel Tubing for Aircraft Industry

Practice followed in the manufacture and preparation for shipment of seamless steel tubing for the aircraft industry has been put in the form of a small pamphlet by the Summerill Tubing Co., Bridgeport, Pa. This company makes its finished product from purchased hot-rolled pierced tubes, of materials selected according to definite specifications. Following the practice employed by the company in its selection of this material are listed 12 operations performed in its own works.

Identification of the individual steel heats is one of the first requirements. Annealing and pickling in preparation for drawing are watched to avoid excessive scale, change in carbon content, and rough surfaces from over-pickling. Drawing may involve 12 or 15 cycles of operations.

After straightening, a final heat treatment is given the steel tubing. This is done in a gas-fired furnace with automatic control. An aircraft inspection department is maintained, independently of the commercial grades of steel. Tests for hardness and other requirements are made and record kept, by tubes numbered consecutively. Certified test reports are then furnished with each shipment and are attached to the invoice.

New Books Received

The Cost of Living in Twelve Industrial Cities. Pages 76, 6¼ x 9½ in. Issued by the National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, $1.50.

The Economic Status of the Wage Earner in New York and Other States. Pages 125, 6¼ x 9½ in., illustrated. Issued by the National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, $2.50.

The Cost of Living in the United States, 1914-1927. Pages 142, 6¼ x 9½ in., illustrated. Issued by the National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, $2.50.

The Fiscal Problem in New York State. Pages 275, 6¼ x 9½ in., illustrated. Issued by the National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, $3.

Annual Report of the Minister of Mines—1927. An account of mining operations for gold, coal, etc., in the Province of British Columbia. Pages 504, 7¼ x 10¼ in., illustrated.

Die Verwendbarkeit der Röntgenverfahren in der Technik. By C. Kantner and A. Herr. Pages 77, 5¾ x 8¼ in., illustrated. Published by Verein Deutscher Ingenieure, Berlin, N.W.7.

Der Kugelschlaghärteprüfer. By J. Class. Pages 20, 8¼ x 11½ in., illustrated. Published by Verein Deutscher Ingenieure, Berlin, N.W. 7.

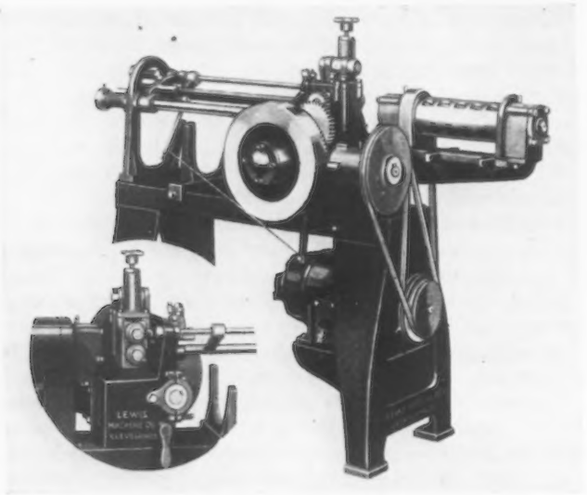
Bergwirtschaftliche Arbeitsgemeinschaft. By Max Krahmann. Pages 184, 5½ x 8½ in. Published by Kurt Vowinckel, Hohenzollerndamm 83, Berlin-Grunewald, Germany. Price, 10 m.

Riemenschlupf und Reibungszahl von Gummi und Ledertreibriemen. By Hans Nowsky. Pages 56, 8 x 11 in., illustrated. Published by R. Oldenbourg, Amalienstrasse 6, Munich 32, Germany.

Motor-Driven Wire Cutting and Straightening Machine

TO meet the demand for a medium-weight, motor-driven, wire cutting and straightening machine, the Lewis Machine Co., Cleveland, has brought out an automatic rotary-type machine for handling wire up to 3/16 in. in diameter. It has several new features, probably the most important of which is a double direct motor drive known as the Texrope drive, made by the Allis-Chalmers Mfg. Co. The straightening arbor requires high-speed power transmission, and this drive eliminates high-speed gearing, oil housings and the noise and vibration that result from the use of gears. The motor is located underneath the machine, being mounted on a bracket bolted to the machine leg.

Bulky castings have been eliminated in the construction, though the machine is rigidly built for hard service. The straightening arbor, main driveshaft and flywheel are mounted on Timken tapered roller bearings, a total of six to each machine. The arbor consists of five sets of dies, which, it is claimed, assures perfect straightening of all sizes of wire. Either hard iron or bronze dies are used, depending on the finish of the wire to be straightened.



Operating Parts of This Straightening Machine Have Been Reduced to a Minimum. The motor is out of the way and the drive mechanism is claimed to avoid noise and vibration

Operating parts have been reduced to a minimum, consisting only of a trip lever and clutch dog, which drives the flywheel shaft. This shaft, which revolves only when the wire is being cut off, is mounted on bronze bushings in the bed. The cutter bar is operated by a cam on the flywheel shaft. A ball bearing mounted in the cutter bar runs on the cam. The clutch is similar in general construction features to a standard punch press clutch.

The feed rolls are geared directly to the flywheel. The lower feed roll shaft runs in bronze bushings in the housing and the upper runs in a long sleeve which takes the pressure from the adjusting screws. An automatic feed roll release lever operated directly from the cut-off shaft releases the pressure from the feed rolls when the wire is being cut off. This, it is stated, prevents slipping of the feed rolls on the wire during the cutting off operation, prevents marking of the wire and increases the life of the rolls.

Designated as the Lewis No. 7-C, the machine can handle 1/16-in. to 3/16-in. wire. It is driven by a 1½ hp. motor at 1800 r.p.m. It occupies a floor space (not including reel) of 16½ in. wide by 3 ft. long for a 2-ft. machine and 4 ft. long for a 3-ft. machine. It is also built in a larger size, for handling wire up to ¼ in. in diameter.

Welded Steel Truck Body for Heavy Service

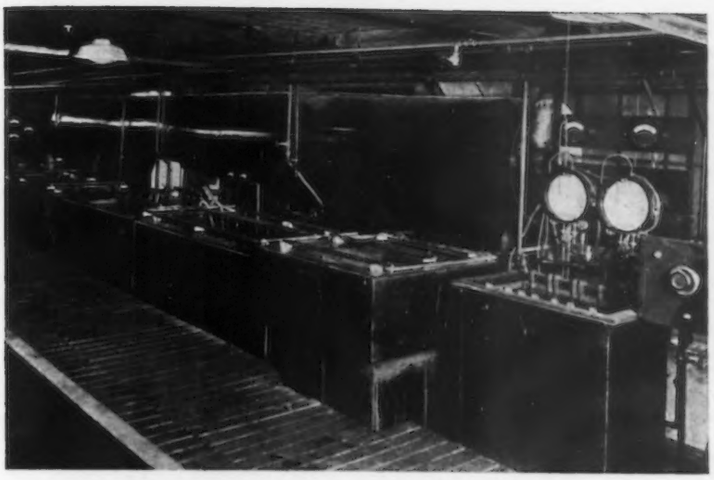
A SHOP truck, known as the "Weldsteel" truck, has been placed on the the market by the Pittsburgh Producers Supply Co., Pittsburgh. It was designed for use in steel mills, particularly for handling wire in coils from wire or nail mills, or sheets, plates, and similar material from sheet mills, or any like service. It has been found suitable for use in other industrial plants also, where heavy loads are to be moved. The truck has a rated capacity of 3 tons, with a safe overload capacity of 100 per cent. It is compact, the dimensions being 5 ft. long, 3 ft. wide overall and 3½ ft. overall height.

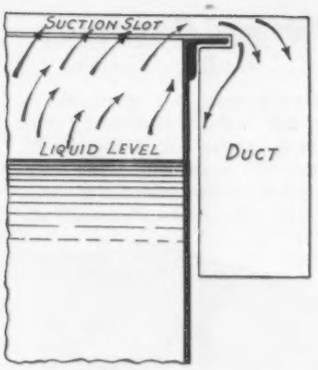
It is made entirely from steel sections, welded together, no rivets being used. The body is made from four heavy channel sections, lap welded to the four angle sections forming the uprights. The uprights are braced by angle sections which are butt and lap welded to them, and the frame is given greater rigidity by gusset plates located at all four corners.

In the truck shown in the illustration V-ends are provided. When this form is loaded with wire coils set perpendicularly, a pipe or steel bar can be passed transversely through the load, to permit its being lifted as a unit by a crane. The V-ends are braced by gusset plates welded to the frame.

The main axle is supported by a cannon-box mounting, made of welded angle sections, and firmly braced by angle sections running to the pilot wheel supports. The wheels, also, are of welded construction, the tires and hubs consisting of flat sections, rolled to shape, and butt welded. The spokes are made of heavy flat sections welded to the hub and tire. The wheels on the main axle are equipped with Timken bearings, the choice of which was determined by the service conditions which the truck must meet. They reduce the amount of power required to move the truck to a point where two men can handle it when fully loaded. Also they are said not to be affected by the expansion and contraction resulting from the wide variations in temperature to which the trucks are subjected in the course of their service, and which sometimes alternate frequently.

Several Forms of This Welded Steel Truck Are Available. It is fitted with roller bearings to reduce friction in handling





The Section Shows How It Works. The exhaust slot appears at the rear, in the photograph

Removing Fumes from Plating Tanks

AN exhaust system for removing fumes from plating tanks is being manufactured by the Cleveland Blow Pipe & Mfg. Co., Cleveland. A sheet metal duct, rectangular in form, surrounds the upper part of the tank, extending slightly above the top, and a narrow slot is provided around the side facing the liquid. An exhaust fan draws sufficient air through the slot at a definite high velocity, depending upon the size of the tank, to form a suction blanket over the tank that prevents fumes from entering the room.

Thus the operator is completely protected, and the top of the tank is unobstructed by overhead exhaust hoods. The fumes are drawn through a header back of the tanks and out into the open air.

The illustration shows an installation of the system in a Cleveland plant, for the removal of fumes from chromium plating tanks. Complete removal is essential, as these fumes are particularly dangerous to the operator. A line drawing shows the way the fumes are drawn off the surface of the liquid and carried away through the duct to a point where they can do no damage either to the operators or to the equipment.

New 2-Yd. Excavating Shovel

ADDITION of a 2-cu. yd. capacity machine has been made to the line of crawler cranes, shovels and draglines built by Link-Belt Co., Chicago, Indianapolis and Philadelphia. Heretofore the largest machine built by this company was a 1½-yd. unit. The Link-Belt K-55, as the new machine is known, is a powerful, heavy-duty, all-purpose, 2-yd. machine, primarily designed for the following adaptations:

Shovel with 30-ft. boom and 18-ft. dipper stick, carrying a 2-yd. struck-measure-capacity all-manganese-steel dipper.

Dragline to handle 2-yd. dragline bucket, for medium and medium-heavy excavating, on boom 50 ft. long; or a 1½-yd. dragline bucket on boom 60 ft. long.

Clam shell bucket of 2-yard capacity, for sand, gravel or materials of equal consistency and weight per cubic foot, on boom 50 ft. long; or a 1½-yd. bucket, for such materials, on boom 60 ft. long; or, of course, an equivalent weight of loaded bucket in heavier or lighter materials.

Trench shovel, 2-yd. capacity.

All attachments are interchangeable without removing or disturbing the mechanism of the machine proper. A special clearance-reducing arrangement contributes to making the machine a convenient one for the contractor, by making it possible to ship it from place to place without dismantling. The K-55 has a collapsible mast, and special shipping treads which may be quickly and easily substituted for the working treads, to bring the machine within the railroad clearance requirements of 10 ft. 4 in. overall width and 16 ft. overall height above top of rail when loaded on flat car.

Specifications include unit cast steel construction of lower and upper frames, self-cleaning crawler treads and large bronze-bushed crawler rollers and inclosed cut gearing and bronze-bushed bearings throughout. There are internal expanding friction clutches of unusual size and power, the main drum clutches being 42 in. in diameter, and swing and travel clutches, 30 in. in diameter.

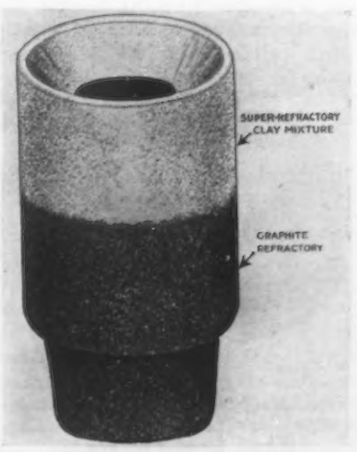
A 13½-in. diameter center pin, adjustable from above, can be removed as a unit with the vertical travel shaft assembly, without removing any other parts. The drums are large, with renewable cast steel shells, having air space between clutch and brake surfaces, for rapid cooling; with large, powerful drum brakes, 48 in. in diameter by 5 in. wide.

In working condition the machine is 12 ft. wide overall at the lower frame, which gives it ample stability for the work for which it is designed. Crawler treads are 36 in. wide. The K-55 is built to be driven with gasoline engine, electric motor or Diesel engine drive.

Ladle Nozzle Made of Two Materials

A NEW combination ladle nozzle is being put out by the Joseph Dixon Crucible Co., Jersey City, manufacturer of crucibles and graphite refractory products. The upper half is super-refractory clay and the lower half is graphite.

The advantage of this combination nozzle, it is stated, is that the metal can leave the ladle at a much lower temperature than is the practice generally, and so a more perfect ingot is poured. This is due to the heat-retaining qualities of the graphite in the lower half of the nozzle. The combination nozzle is made in any customary size and with flow hole as required.



Air-Cushioned Compressor Valve

AN air-cushioned air compressor valve has been developed by the Pennsylvania Pump & Compressor Co., Easton, Pa. There is an air cushion pocket in the guard. As the valve opens, the disks, instead of

Section of Valve, Showing How the Parts Are Assembled

striking the guard, enter the air pocket. Air trapped in this pocket provides a cushion, which prevents the valve from striking the metal of the guard.

The valve assembly is held together by means of a retaining ring, which engages the valve guard and seat. The only function of the retaining ring is to hold the guard and seat together while the valve assembly is being placed in the cylinder chamber or removed from it. With the valve assembly in position, it is held firmly to its seat in the cylinder by the clamp, which is drawn up tight against the assembly by means of the valve cover set screw.

The air valves are mounted radially at each end of the cylinder. Each cover is held in place by four tap bolts, while a central set screw holds the complete valve assembly in place.

Segmental Grinding-Wheel Chuck of Simple Design

SAMUEL C. ROGERS & CO., Buffalo, have placed on the market the segment grinding-wheel chuck here illustrated, which is offered for use on the company's new knife grinding machines and also on face and surface grinders of other manufacture. Simplicity of construction is a feature emphasized.

When Half Worn, the Upper Clamps Are Removed and the Wheel Used Further

Five standard sizes of the chuck, from 12 to 22 in. are available, the chuck illustrated being the 14-in. size which carries eight 4 x 4 x 1¼-in. segments. The segments are mounted in a strong and accurately machined chuck having parts which are conveniently adjustable and are arranged for securely holding the segments. The weight of the chuck, with segments, is approximately 60 lb. Larger sizes can be furnished.

The chuck is made up of an inner ring and two sets of clamping wedges. When the segments are worn half way down the outer wedges and the inner ring are removed and use of the wheel continued until the segments are entirely used up. Butts of old segments are removed by loosening the last row of clamping wedges. New segments are then inserted and both rows of clamping wedges are replaced. The wheel is protected with a suitable guard arranged to conform with the wearing of the segments.

Lock Washer of Two Parts With Serrated Edges

CLOSER adjustment than is possible with the standard castellated nut and cotter pin is a feature claimed for the lock washer illustrated which is being placed on the market by Robert E. N. Marks, 4403 Sheridan Road, Chicago.

Serrations on the Two Washers Are Depended Upon for Locking

This device consists of two washers, one of which is formed with a center boss and a raised outer edge in which serrations or teeth are cut. This washer is placed over the bolt with the serrated face away from the head and a flat side is provided on the bolt to prevent this washer from turning. The second washer, also formed with a boss and an outer ring of teeth, is dropped over the bolt so that the serrations on both washers match. The second washer is recessed on its outer side, forming a seat for the nut so that the top washer and the nut turn together.

Differential Hoist Has Copper-Plated Chain

A NEW direct differential hoist being manufactured by the Chisholm-Moore Hoist Corporation, Cleveland, is called the "Blue Boy." It has been equipped with the Hercules

Inswell electric-welded load chain. The extra-heavy load sheaves, malleable iron yokes and drop-forged hook are painted blue, and the Inswell chain is copper plated.

Standards for Lift Trucks and Skid Platforms

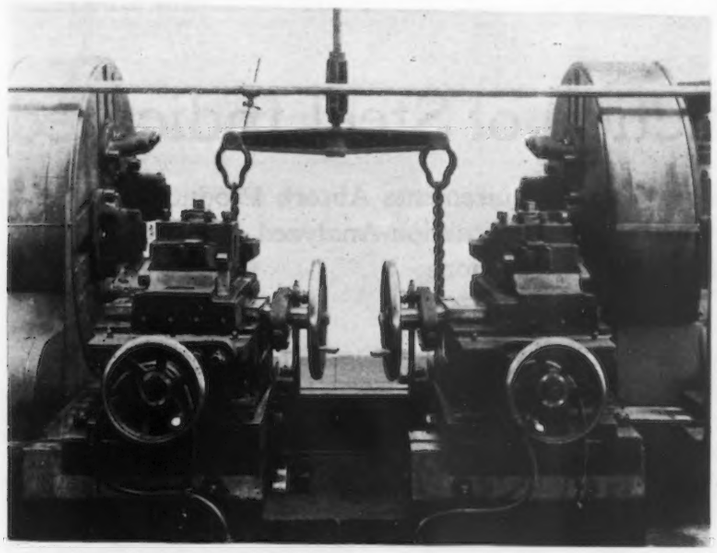
TWO standard dimensions, 8 in. and 12 in., for under clearance of skid platforms were adopted at a general conference of manufacturers and users, held June 28 at the Department of Commerce. It was agreed that the minimum clearance between runners or supports on the skids be not less than 29 in. The conference favored establishment of standard dimensions for over-all length and width of skid platforms. It was decided that there should be two width standards—one such that the skids could be placed three abreast in a freight car and the other the same length, but twice the width of the first skid. These recommendations, subject to acceptance on the part of interested parties, are to become effective Oct. 1.

Topping a 100-ft. fabricated steel tower on the roof of the new Penobscot Building, Detroit's tallest office building, what is said to be the world's largest and highest Neon aviation beacon was lighted for the first time on Thursday night, June 28. Resembling a red ball of flame when lighted, the beacon is 12 ft. in diameter, 655 ft. above the ground and can be seen 60 miles away on a clear night.

Carwheel Lathe Equipped to Handle Sets with Roller Bearing Journals

CHANGES have been made in the tool rests and bed of the No. 4 carwheel lathe of the Niles-Bement-Pond Co., 111 Broadway, New York, to adapt the machine for the chucking either of plain journal or roller bearing wheel sets for tire turning.

Inasmuch as it is impractical to remove the roller bearing housings from the journals, the wheels cannot be chucked by split bushings, but are mounted on centers in the sliding spindles, it being necessary only to remove the cover plate of the housing to expose the centers in the axle. This method of chucking requires lateral adjustment of tool rests along the bed to bring the cutting tools opposite the wheel treads, owing to the greater distance between the faceplates when axles are held on centers. Therefore each tool rest is mounted on a sub-base having a small amount of lateral adjustment by rack and pinion.



Changes in the Tool Rests and Bed Adapt the Lathe for Chucking Either Plain Journal or Roller Bearing Wheel Sets

Blow Gun for Dusting Out Molds, Machine Tools and Motors

SAVINGS in compressed air are claimed for the blow gun illustrated which is being offered by the Schutte & Koerting Co., Twelfth and Thompson Streets, Philadelphia, for blowing out castings, dusting out molds, removing dust and chips from machine tools and for other similar uses.

The device operates on the jet principle, and is designed for attachment to a ⅜-in. compressed air hose. A button in the small cup on the body of the gun opens a valve and admits the compressed air to the pressure nozzle. A jet of air issues from this nozzle at high velocity and entrains atmospheric air through the rectangular ports, the mixture discharging at pressure high enough for the uses for which the gun is intended. It is stated that with compressed air at 60 lb. pressure the blow gun will deliver a given quantity of air at a moderate pressure, using only 50 per cent of the high-pressure air required with a plain nozzle. A ring is cast on the body of the device so that when not in use the gun may be hung upon a conveniently located hook.

Compressed Air Issuing from the Nozzle Entrains Atmospheric Air, the Mixture Discharging at Ample Pressure for the Work

Long-Boom Motor Crane for Handling Construction Steel

MAKING use of a 52-ft. boom with 7½ tons capacity on a Mack truck of the same capacity, the McClintic-Marshall Co. has put into use a new crane unit furnished by the Universal Crane Co., Swetland Building, Cleveland. This is being employed in suburban districts of New York for unloading and distributing steel, as well as on erection jobs.

To a standard 28-ft. boom has been added a demountable 8-ft. foot extension and a demountable 16-ft. head extension, making a total length of 28 ft. Both extensions are readily removable, so that the crane may be used with the 28-ft. boom where heavier lifts and not such high reaches are necessary. The boom can be used in lengths of 28, 36, 44 and 52 ft.

Flexibility Is Provided by Having the Boom in Demountable Sections

A motor truck crawler is fitted on the rear end of the truck chassis, which consists altogether of a combination truck and crawler. This is convertible in 15 or 20 min. to a crawler rear end, capable of traveling through soft ground at truck speed.

June shipments of electric industrial trucks and tractors numbered 117, compared with 116 in May as reported by the Department of Commerce. The figures compare with 140 in June last year. Of the current total 14 vehicles were for export. Six of the domestic units were tractors and 97 of other types. In the first half, 732 units were shipped, compared with 695 last year.

Business Analysis and Forecast

No Over-production of Steel Indicated

Though Output Is Large, and Requirements Absorb Production, Prices Remain Weak—Situation Analyzed by Series of Questions

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

AS shown in the first chart, the broad statistical facts concerning the steel industry as it was in June are as follows: (1) Production of steel ingots was at a reduced rate, but was still considerably above "normal"; (2) unfilled orders of the Steel Corporation recovered from the slump of the preceding three months, but were still much below the monthly average for 1923-1927, even allowing for seasonal conditions; (3) the composite price of finished steel sagged slightly to the lowest monthly average since last January. In short, production is large, order books are low, and prices are naturally weak.

According to our estimate of normal, the average daily ingot output last month was 108.9 per cent, which compares with 110.3 per cent in May and 102.8 per cent a year ago. Thus, even after discounting a seasonal decline (from May to June) of over 6 per cent, there was left a net decrease; but production remained nearly 9 per cent above normal. In spite of seasonal influence the unfilled orders increased 6½ per cent. Even so they were actually only 84 per cent of the monthly average for the past five years, or 90 per cent, if we make adjustment for seasonal conditions. At 2.341c., the June average price of finished steel was only 92.7 per cent of the average for 1923-1927.

One can find no month in any recent year which is analogous to June in the sense that all of the foregoing statements would apply. And the peculiarity of the situation is the more marked if we add that in no recent year has steel production, throughout the first half, been so much further above normal trend than pig iron production has been above its trend. As we figure it, the average daily pig iron production in June was 106.3 per cent of normal, which compares with 106.8 in May and 107.2 a year ago.

Production Below the Heavy Demand

WHILE steel production is above normal, May figures show that in that month it was below the level of the normal current requirements of the chief consuming industries. That is to say, a composite of the indexes of activity in the chief iron and steel consuming industries shows that their potential requirements were relatively high (see Fig. 2).

Railroad traffic gained more than usual for the season, and both automobile production and building activity showed an upward trend. Even manufacturing (excluding iron and steel and automobile industries) increased. Mining held about level, declines in coal production being offset by gains in copper. Domestic oil production and drilling activity both showed further small decreases. Machine tool orders declined, and agricultural purchasing power was a little lower. The net result is that the composite index of potential demand for steel for May increased to 119, as compared with 115 in April. This is not so high as in February, but, with that exception, is the highest since September, 1926.

As the chart shows, it is well above the usual relation with the curve of steel ingot output. This means that, in spite of the decline in forward buying which occurred in May, the chief customers of the steel industry were using up steel at a rapid rate and that the steel producers were either accumulating no stocks, or only such as the potential requirements of the country justified. In short, no over-production is indicated by the statistics.

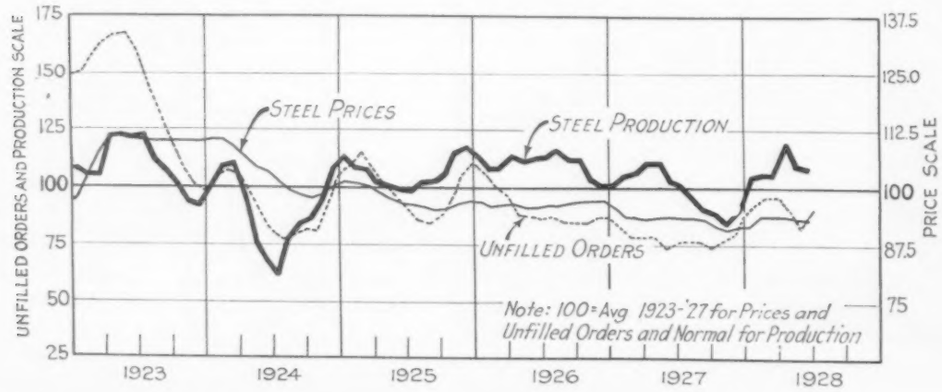


Fig. 1—Steel Production in June Was 9 Per Cent Above Normal Requirements. Prices have been sagging. Unfilled orders showed an upward movement at the end of June

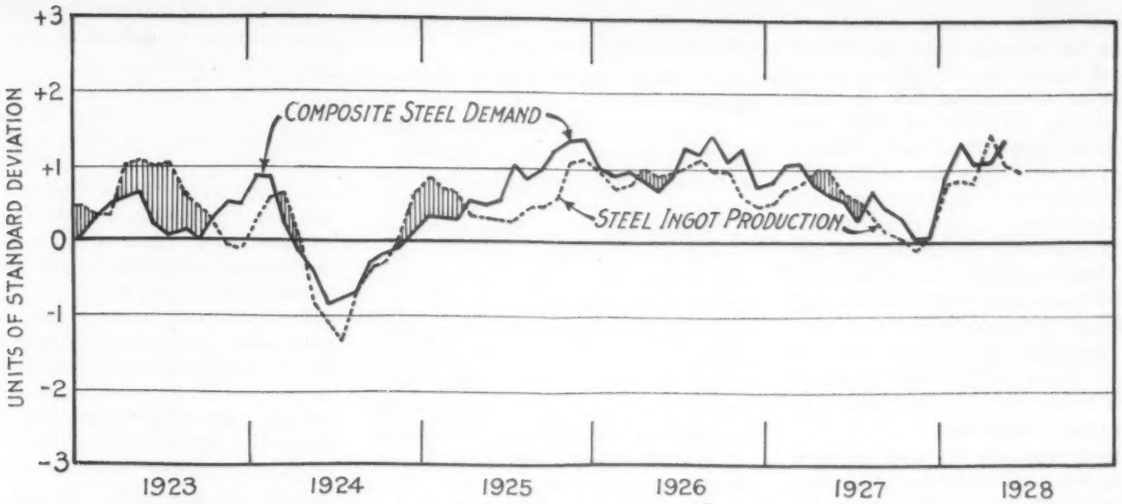


Fig. 2—Steel Production Has Again Fallen Below the Level of Composite Demand. This latter is higher than at the same season in previous years

June data show railroad freight traffic not up to the usual seasonal gain for the month, and indicate continued scanty buying on the part of the carriers. Orders for railroad cars and locomotives were the lowest since January. On the other hand, building activity did not show the usual June decrease, and the large volume of contracts awarded promises further good business in structural steel. Building permits showed an upward trend also. Trade reports indicate June awards of fabricated structural steel larger than in May, the weekly average being 42,000 tons, compared with 22,800 tons in the preceding month. Automobile production is tapering, but holds unusually well for the season. Apparently general manufacturing activity is well sustained.

Five-Month Total of Sales Highest Yet

CONFORMING to the indications of the composite demand line, our index of orders and sales, covering some of the chief items of finished steel, increased in May. This is the only one of the six years, shown in the third chart, in which sales increased in that month. The May figure is much above that for the same month in any of the preceding years. As a result, the total sales of finished steel for the first five months exceeded those for the same period, even in 1923.

Sales of steel sheets and plates fell off in May, which is usually a seasonal occurrence, while the sales of structural steel and steel castings increased over April. All four of these items, which together totaled 3,448,000 tons, were much above May last year, when the total was 3,203,000 tons. It is to be remembered in this connection, however, that May this year had one more working day.

Why the Present Steel Situation

SO unusual is the steel situation at present that a number of queries are suggested:

(1) *Is steel production in the first half of* 1928 *record-breaking?*

Answer: Not in any true sense. If we allow for the slow, steady, normal growth of the requirements of the country, conservatively estimated, we find that steel production in the first six months was relatively smaller than in either 1923 or 1926. A carefully

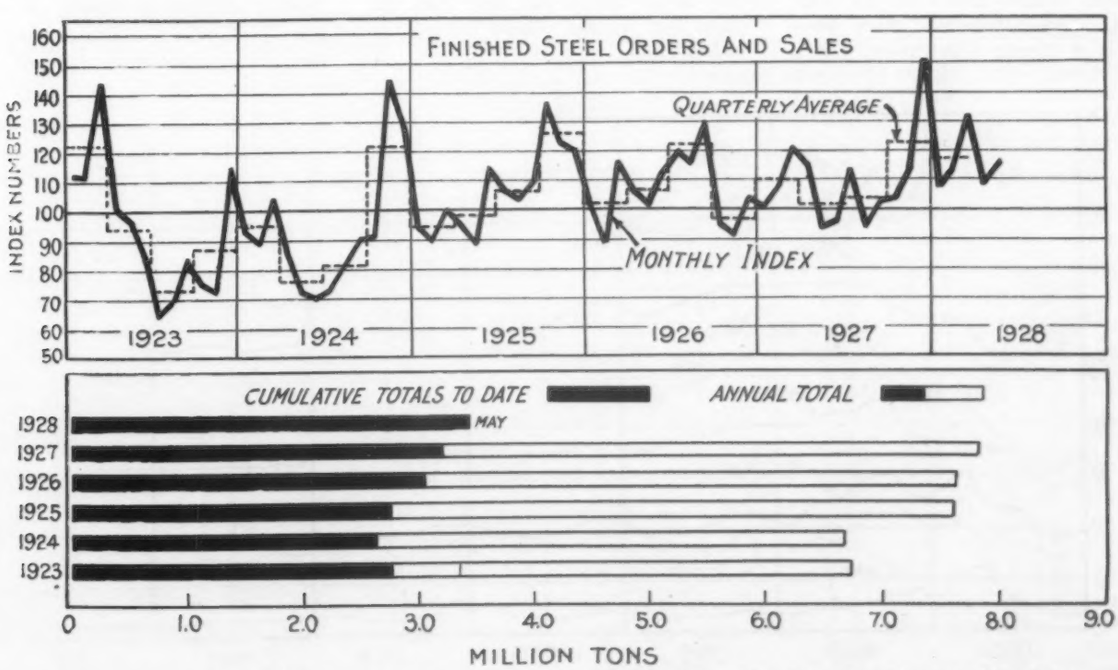


Fig. 3—Buying of Finished Steel Was Higher in May Than in That Month in Any Previous Year Shown. The cumulative total is the greatest for any year on the diagram

adjusted index, showing what percentage the average daily production of steel ingots is of normal, averaged 109.2 in the first half of 1928, 111.3 in the first half of 1926, and 113.9 in the first half of 1923. The index for April, 1928, which is the peak month of the year, is 119.1; for May, 1923, it is 122.5. Thus steel production is absolutely higher, but has not maintained its normal rate of growth.

(2) *Why is steel production so well maintained at around 8 to 10 per cent above normal, while prices are low, unfilled orders small, and railroad freight traffic and factory labor employment relatively low?*

Answer: In spite of small forward buying, the activity in the steel consuming industries is such as to make current requirements large enough to take care of an above-normal steel output. Steel production is below the level of our composite demand curve and orders for finished steel are well over 110 per cent of the average for the last five years. In spite of reduced railroad buying, the automobile, building, tin plate and agricultural implement businesses have been operating at above-normal rates.

(3) *Why then are steel prices so low?*

Answer: The production of steel is considerably below the capacity of the steel producers and is well up to current requirements. Competition among producers is keen in a good many directions, and there is no shortage of supply in prospect. At the same time, the general trend of commodity prices is downward, and competition among buyers is so keen that their margins of profit are low and they cannot afford to pay high prices. The automobile sheet business is a strong illustration. In a sense, the low prices make possible the high production.

(4) *Why is pig iron so low in price?*

Answer: Pig iron is cheap compared with finished steel, about right compared with scrap, and about as low as it ever gets compared with coke. In comparison with their estimated normal levels of production, the output of pig iron is not too high, as judged by steel production. One almost infallible barometer of pig iron prices, however, is found in the ratio of pig iron production to steel ingot production, taking into consideration the level of steel prices. When this ratio turns upward and is high, pig iron is always weak in price. This condition has existed in most of the months since February, 1927, and during that time the general trend of pig iron prices has been downward.

Other reasons are as follows: Imports of pig iron, though lower in May, in the first five months of the year were 35 per cent greater than in the same period of 1927. Pig iron is weak in foreign markets and production in France and Belgium exceeds the output of crude steel. The domestic markets for pig iron are highly competitive, with water transportation playing an increased part. Low coke prices have facilitated the decline in pig iron.

(5) *Why the considerable increase in unfilled orders in June?*

Answer: In large part, the increase must have been due to three conditions: (1) additions to and extensions of second quarter contracts that had been made at lower than current prices; (2) declining shipments; (3) a few large orders for line pipe, tin plate and bridges, placed toward the end of June.

(6) *Does the increase in unfilled orders forecast an upturn in steel production and prices?*

Answer: No. In the first place, the nature of the causes of the increase deprives it of much of its significance. It will be noted that it did not occur at the same time with expanding production, as was the case in 1922 and in 1924; on the contrary, it occurred with steel production declining from a high point. In the second place, the significant rises in unfilled orders rarely come as such sharp reversals of trend as this one. Usually, making allowance for seasonal variation, significant increases come after the unfilled orders have tapered off in their decline and have then begun to rise gradually. In the third place, there is nothing in the general condition of industry to explain any such rush of forward buying as the upturn might seem to indicate.

(7) *With automobile production and building activity so great, and taking such quantities of sheets as would seem necessary, why are sheet prices so weak?*

Answer: According to returns from "independent" manufacturers of sheets (who produce probably upward of 75 per cent of the total output), production of sheets was very large and on the increase in May. It was above shipments. As a result, stocks increased. The sales of sheets do not show a rising trend, but the contrary. A three-month moving average has pointed downward steadily since December, and May sales were the lowest since last October. Evidently automobile makers are taking a smaller quantity of sheets as they near the period of seasonal decline. Residential building has increased only in New York, where apartment construction is the outstanding feature.

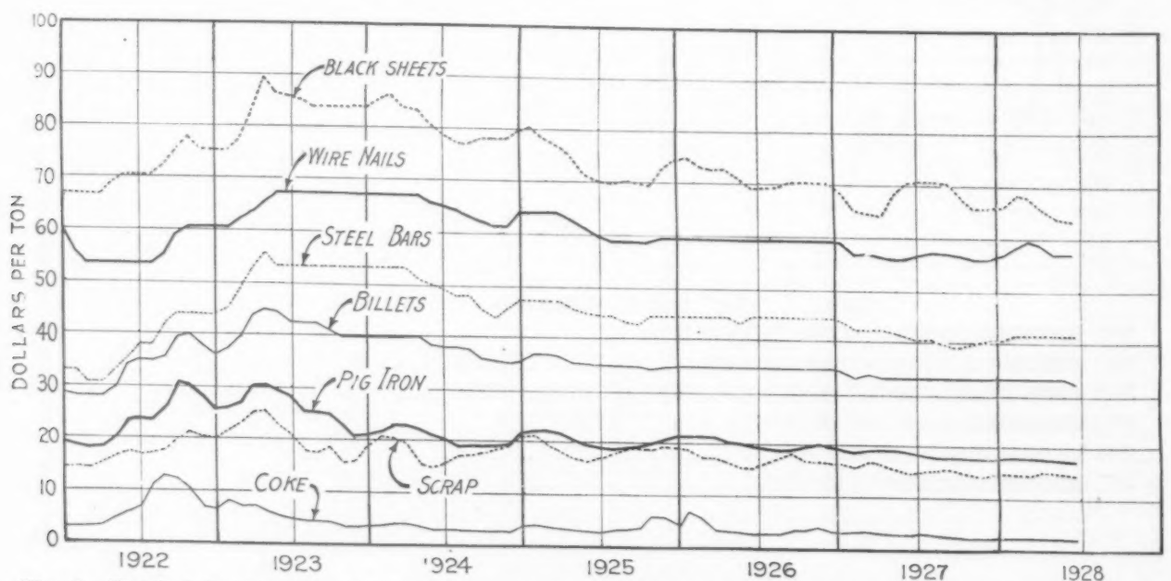


Fig. 4—Finished Steel Prices (in Particular, Sheets and Nails) Are Relatively Low, Compared with Semi-Finished and Raw Materials. But supplies are abundant and improvement is not indicated

No Improvement in European Markets

Holidays Hamper British Output—Lower Prices Hit German Steel Production—Consumption Active in Japan

(*By Cable*)

LONDON, ENGLAND, July 16.

IRON and steel markets are quiet, as the Glasgow Fair holidays have commenced. Normal resumption cannot be expected before the end of this month. The pig iron position is getting worse, as both domestic and export demand are poor; consumers are not making forward contracts. Cleveland producers are still well placed for a few weeks, on restricted output, but are desirous of putting new business on their books. Hematite is practically dormant, except for a few small export sales.

Foreign ore markets are idle, as consumers are well covered, but the Swedish strike continues. There is some tendency among German users to enter into two-year contracts at a flat rate.

Finished steel markets are quiet, in the heavy branches, and competition among makers is keen in non-association products. Plate mills, especially, are in need of orders, but the sheet mills and constructional and engineering departments are moderately busy.

June exports of pig iron were 33,200 tons, of which 6500 tons went to the United States. Total iron and steel exports were 365,900 tons.

Tin plate markets are quiet and there is talk of reimposing the output restriction for October to December. Makers at present are well sold and the mills are running at well over 90 per cent of capacity. Consumers' demand has been affected by recent weakness in tin, but it is expected to revive when the tin situation is more settled. There is considerable inquiry still circulating. Over 54,000 tons of tin plate and terne plate was exported in June. Galvanized sheets are quiet and black sheets are dull.

On the Continent

Continental iron and steel markets are quiet, as regards consumers' demand, but the termination of the Antwerp dockers' strike caused some merchant covering. Prices generally are steady, with a slight upward tendency in semi-finished materials.

German Steel Output Declining

Weakening in Home Market and in Continental Prices—Cartel Uninfluenced by American Export Combine

BERLIN, June 30.—The slackening of home trade continues to react upon activity in iron and steel. Employment, owing to seasonal influences, is still improving and wages are rising; but the trade slackening is unmistakable. A further unfavorable influence on the steel industry is the weakening of the Continental market, which had been active, with rising prices, since October, 1927. The general outlook for iron and steel is a gradual decline of production during the remainder of this year and it is almost certain that 1928 will not repeat the high production of 1927.

Comparative production figures for the last reported month and for the first five months of the year are:

	May, 1928	May, 1927
	Metric Tons	
Pig iron	1,044,046	1,129,802
Ingots	1,247,781	1,377,737
Rolled steel..	986,459	1,087,068
	Jan.-May, 1928	Jan.-May, 1927
	Metric Tons	
Pig iron	5,565,030	5,297,474
Ingots	6,619,077	6,625,147
Rolled steel..	5,197,954	5,228,571

Output of Steel Falling

Average output per working day has been falling since March. The demand for steel from the building industry is lower than was expected. The demand from engineering and machinery-construction works has declined. Home shipbuilding is inactive and the Railroads Corporation is giving only very small orders for permanent way materials. June production returns will probably show further declines for pig iron, steel, and rolled goods.

Uncertainty in Export Market

The export market is uncertain. In the second and third weeks of

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.86 per £ as follows:

Durham coke, del'd.....	£0	17½s.	to £0	17¾s.	$4.25	to	$4.31
Bilbao Rubio ore*.....	1	2½			5.48		
Cleveland No. 1 fdy.....	3	8½	to 3	9½	16.64	to	16.89
Cleveland No. 3 fdy.....	3	6			16.04		
Cleveland No. 4 fdy.....	3	5			15.80		
Cleveland No. 4 forge...	3	4½			15.68		
Cleveland basic (nom.)..	3	5			15.80		
East Coast mixed.....	3	8	to 3	9	16.53	to	16.77
East Coast hematite....	3	10½			17.13		
Rails, 60 lb. and up.....	7	15	to 8	5	37.66	to	40.10
Billets	6	5	to 6	15	30.39	to	32.81
Ferromanganese	13	15			66.83		
Ferromanganese (export)	13	0	to 13	5	63.18	to	64.39
Sheet and tin plate bars, Welsh	6	0			29.16		
Tin plate, base box.....	0	18¼			4.43		
Black sheets, Japanese specifications	13	7½			65.00		
					C. per Lb.		
Ship plates	7	12½	to 8	2½	1.63	to	1.74
Boiler plates	9	0	to 10	10	1.92	to	2.25
Tees	8	2½	to 8	12½	1.74	to	1.84
Channels	7	7½	to 7	17½	1.58	to	1.69
Beams	7	2½	to 7	12½	1.53	to	1.63
Round bars, ¾ to 3 in..	7	5	to 7	15	1.55	to	1.66
Steel hoops	9	0	to 10	0	1.92	to	2.14
Black sheets, 24 gage...	9	15	to 10	0	2.09	to	2.14
Galv. sheets, 24 gage....	13	7½			2.86		
Cold rolled steel strip, 20 gage, nom.	16	0			3.42		

*Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):							
Belgium	£3	3s.	to £3	5s.	$15.32	to	$15.80
France	3	3	to 3	5	15.32	to	15.80
Luxemburg	3	3	to 3	5	15.32	to	15.80
Basic pig iron (nom.):							
Belgium	3	1	to 3	2	14.82	to	15.07
France	3	1	to 3	2	14.82	to	15.07
Luxemburg	3	1	to 3	2	14.82	to	15.07
Coke	0	18			4.37		
Billets:							
Belgium	4	15			23.09		
France	4	15			23.09		
Merchant bars:					C. per Lb.		
Belgium	5	13½	to 5	14	1.25	to	1.26
France	5	13½	to 5	14	1.25	to	1.26
Luxemburg	5	13½	to 5	14	1.25	to	1.26
Joists (beams):							
Belgium	4	17½	to 4	18	1.07	to	1.08
France	4	17½	to 4	18	1.07	to	1.08
Luxemburg	4	17½	to 4	18	1.07	to	1.08
Angles:							
Belgium	5	10	to 5	12½	1.21	to	1.24
¼-in. plate:							
Belgium (a)	6	11			1.44		
Germany (a)	6	11			1.44		
⅜-in. ship plate:							
Belgium	6	7			1.40		
Luxemburg	6	7			1.40		
Sheets, heavy:							
Belgium	6	1			1.33		
Germany	6	1			1.33		

(a) Nominal.

June export orders declined. This was followed by a brief revival, but toward the end of the month the Continental market again weakened. French and Belgian prices fell. German export prices were also slightly cut. The Stahlwerksverband, which had been exporting bars at £5 15s. ($27.90) per ton cut its price to £5 14s. ($27.65). Owing to big shipbuilding orders, the Continental sheet market has not shared in the new general weakening. German home prices of wire cables have been raised on an average 3 per cent. Wholesale prices of German iron and steel on June 27 averaged 28.3 per cent more than in 1913-14; wholesale prices of machinery, machine-tools, and other metal instruments of production 37.1 per cent more than in 1913-14.

No important measures were decided upon at the quarterly general meeting of the International Steel Cartel held at Düsseldorf on June 26. As president of the cartel, to replace the late M. Mayrisch, was elected Director-General Meyer, who had already succeeded M. Mayrisch as chief of the Arbed Corporation of Luxemburg. The effect of this election will be that Luxemburg will continue as headquarters of the cartel. No change was made in the cartel's production program for the third quarter of 1928 or in the quotas of the member countries. The existing system of mitigating Germany's penalties for exceeding its production quota will be retained. This system consists in exacting the full penalty of $4 per ton only upon that part of Germany's over-quota production which is exported, while the part sold at home is penalized only to the extent of $1 per ton.

Nothing was done to form the long-planned selling syndicates for the individual products controlled by the cartel, but the matter was discussed unofficially. The question of Poland's entry into the cartel did not come up. The Central European group, consisting of Czechoslovakia, Austria, and Hungary, which at present belongs to the cartel as an indivisible unit, applied to be dissolved into three national units. At present this three-country group has a combined production quota of about 2,100,000 metric tons. A commission was appointed to consider the application for dissolution.

Cartel Uninfluenced By American Action

The cartel's policy has not been influenced by the news of the foundation of the Steel Export Association of America, but the American move has made a considerable stir in West Germany steel circles. Düsseldorf experts express the view that an active American policy in the sense of the Steel Export Association would tend to stabilize world prices and European prices. But they affirm that no serious American invasion of the European market is likely, even if there is a decline in the American home demand. This view is based upon the high land and water freight charges which American exporters would have to bear. The fact that Canada, South America, and the Far East, in which the freight advantage lies with the United States, have hitherto been the chief takers of American iron, is adduced as a further argument.

British Exports Up; Imports Down

WASHINGTON, July 17.—Continuing tendencies of previous recent months, exports of iron and steel from the United Kingdom increased and imports decreased in June. The outgoing movement was 365,890 gross tons, a gain of 6873 tons or 1.9 per cent when compared with May. Imports totaled 210,405 gross tons, a decline of 26,447 tons or 11.2 per cent, according to a radiogram received by the Department of Commerce from the American Commercial Attaché in London. The import tonnage was the lowest for any month since June, 1925.

Increase in the export shipments was reflected in 15 of the 22 classes into which the trade is divided. The net gain, however, was held down by the substantial losses in galvanized sheets, which dropped to 54,167 tons in June as against 61,061 tons in May, a decrease of 6894 tons; in pig iron, which declined to 39,284 tons from 45,084 tons, a loss of 5800 tons; in cast iron tubes, which decreased to 8560 tons from 12,097 tons, a drop of 3537 tons; and in wrought tubes, which declined to 22,478 tons from 24,923 tons, a drop of 2445 tons.

Some of the more important gains were made in tin plate, which rose to 54,615 tons from 47,358 tons, a gain of 7257 tons; in steel bars, which increased to 29,874 tons from 24,190 tons, a gain of 5684 tons; in rails, which increased to 25,388 tons from 22,206 tons, a gain of 3182 tons; in hoops, which totaled 6176 tons as against 3376 tons, an increase of 2800 tons; and in railroad material, amounting to 21,016 tons as compared with 18,971 tons, an increase of 2045 tons.

In the import list only four classes showed gains, while 15 reflected losses. Cast iron pipe was the only important item showing an increase, rising to 5935 tons from 3765 tons, a gain of 2170 tons. The largest decrease was in semi-finished steel, which dropped 8724 tons to 86,866 tons from 95,590 tons. Imports of hoops declined 6603 tons, to 8946 tons from 15,549 tons; of iron bars, 6076 tons, to 8769 tons from 14,845 tons; of pig iron, 2534 tons, to 7515 tons from 10,049 tons; and of wrought tubes, 1499 tons, to 5361 tons from 6360 tons.

Production of both pig iron and ingots decreased in June when compared with May. The blast furnace output was 563,700 tons, as against 590,500 tons, while steel works production was 709,500 tons as compared with 752,700 tons. At the end of June 141 blast furnaces were blowing, a decrease of seven under the number in blast at the end of May. The number of open-hearth furnaces in operation increased by one, to 262.

Developments in Iron and Steel in Australia

Expansion and production of iron and steel plants are both reported on by United States Trade Commissioner E. C. Squire, Sydney, Australia, as follows:

Further steps looking toward the formation of the Australian Iron & Steel Co. have been taken by the calling of a meeting of the shareholders of the Hoskins Iron & Steel Co., Ltd., to pass the necessary resolutions for the sale and transfer of the assets of that company to the Australian company.

Extensions costing about £200,000 and consisting of five more rolling mills, a galvanizing plant, and certain other works are planned for the Newcastle Works of John Lysaght's (Australia), Ltd. The addition of this new equipment is expected to increase the productive capacity of this company by 50,000 tons of galvanized and black sheets a year.

Pig iron production by the Broken Hill company during April, the latest month for which returns are available, was considerably below that of the same month of the year previous—production during those two periods being 15,338 tons and 25,310 tons respectively. Steel production during this same month was also reduced by this comparison but to a less marked degree, 20,170 tons being produced in April, 1928, against 28,712 tons in April, 1927. Over the four months ended April 30, this company made 57,143 tons of pig iron (against 112,688 tons during January-April, 1927), and 85,635 tons of steel ingots (107,381 tons).

Hold Mass Production Insecure for Capital and Labor

CAMBRIDGE, ENGLAND, July 4.—That mass production is insecure for both labor and capital because of its dependence upon wide markets, and that social research and scientific management under the joint auspices of labor and employers are needed to give stability to industry and to protect wage earners against those effects of mechanization which are detrimental, was pointed out by speakers from the United States, Great Britain, Germany and other countries at the Congress of the International Industrial Relations Association (for the study and promotion of satisfactory human relations and conditions in industry) which has just completed its five days' discussion of the subject, "Fundamental Human Relationships in Industry," at Cambridge. The congress was attended by personnel managers and welfare

workers, employers, representatives of labor, factory inspectors and research workers from twenty countries.

The speakers included: The Rt. Hon. Lord Askwith, K.C.B.; Victor Branford, Sociological Society, London; C. Delisle Burns, lecturer University of Glasgow; Miss Kerstin Hesselgren, inspector of factories and Member of Parliament, Sweden; Paul U. Kellogg, editor *Survey*, New York; Dr. Otto Lipmann, director Institute for Applied Psychology, Berlin; Hans Mars, executive officer, Chamber of Labor, Vienna, Austria; Dr. Charles S. Myers, director National Institute of Industrial Psychology, London; Maj. L. Urwick, Management Research Groups, London; and Dr. Frieda Wunderlich, Bureau for Social Politics, Berlin.

The officers of the International Industrial Relations Association elected for the ensuing three years were: President: C. H. van der Leeuw, partner of de erven de Wed. J. van Nelle, Holland; vice-presidents: Miss M. van Kleeck, Russell Sage Foundation, New York; Miss M. L. Fleddérus, Holland, and Erich Lübbe, chairman of the works' council Siemens, Ltd., Berlin; treasurer, Charles E. Jacob, managing director, W. & R. Jacob & Co., Ltd., Dublin.

Large Exports of Metal-Working Machinery

Shipments in 1927 Greatest Since 1920—Europe Takes Over Half of Total

WASHINGTON, July 17.—Valued at $25,379,000, exports of metal-working machinery from the United States in 1927 reached the largest volume in seven years, or since the abnormal year of 1920, according to a statement prepared by S. R. March, Industrial Machinery Division, Department of Commerce. The total of last year exceeded by 35 per cent the exports of 1926 and was greater than such shipments in 1925, which had marked an abrupt increase over previous years.

Mr. March pointed out that the marketing of this large volume of equipment is of especial interest, inasmuch as metal-working machinery is in demand only in those countries which enjoy a certain degree of industrial development. The principal markets for this class of machinery are therefore to be found among the most highly industrialized nations, and consequently among the countries which are the keenest competitors of the United States for the world's metal-working machinery trade.

The outstanding development in the foreign metal-working machinery trade was the gain of $4,900,000, or 50 per cent, in shipments to Europe. The decline in these exports to Europe in 1926 was responsible for the poorer showing of that year as compared with 1925. This loss has now been more than offset. Europe in 1927 absorbed twice as much American metal-working machinery as in 1924, and three times the total value of 1923. As a result of these gains, Europe imported last year 57.5 per cent of the total United States exports of this class of machinery, or 6.1 per cent more than in 1926. Latin America, on the other hand, imported only 10.4 per cent, or 4 per cent less than in 1926.

The United Kingdom and Canada continued to be the largest individual markets for United States exports of metal-working machinery. Shipments into these countries increased by more than $1,000,000 in 1927. Germany, whose purchases fell off about 67 per cent in 1927 from the record purchases of 1925, still imported more than three times as much metal-working machinery in 1927 as in the previous year. Germany's imports, valued at $3,175,000, compare strikingly with $77,120 in 1922; $209,474 in 1923 and $545,315 in 1924. Imports into France showed a substantial gain over 1926, but did not quite equal those of 1925.

One of the most noteworthy developments in individual markets has taken place in shipments to Soviet Russia in Europe, which amounted to $1,046,000 in 1927, as compared with $538,000 in 1926 and only $930 in 1922. Shipments to both Argentina and Brazil reached record volume and indicate the rapid industrial progress which is developing in those countries. The Philippine Islands likewise imported the largest volume of metal-working machinery in recent years, exceeding the average for the preceding five years by more than 50 per cent. There were also a few sharp decreases in exports, notably in the cases of Mexico and Chile.

United States Exports of Metal-Working Machinery
(In thousands of dollars)

Destination	1913	1919	1920	1921	1922	1923	1924	1925	1926	1927
Canada, Newfoundland	2,328	4,041	5,830	1,226	1,641	2,965	1,768	2,340	3,229	4,670
Europe (except Balkans)	12,263	40,982	25,267	8,569	3,914	4,854	7,350	13,762	9,694	14,590
South America	572	2,033	1,952	1,764	857	853	941	1,628	1,623	1,831
Mexico and Central America	98	421	752	871	506	707	495	729	822	502
West Indies	129	808	1,364	725	284	433	408	409	273	303
Total Latin America	*799*	*3,262*	*4,068*	*3,360*	*1,647*	*1,993*	*1,844*	*2,766*	*2,718*	*2,636*
Asia (except Asia Minor)	199	8,815	7,427	5,137	4,326	2,386	2,581	1,821	1,638	1,977
Australasia	463	801	1,090	615	483	726	747	931	1,163	1,096
Africa	37	545	400	400	93	158	248	313	372	349
Other countries	8	62	230	327	20	22	52	104	54	61
Total, all countries	16,097	58,508	44,312	19,636	12,124	13,105	14,590	22,037	18,868	25,379

Active Steel Consumption in Japan

WASHINGTON, July 17. — Demand for steel throughout practically the whole of Japan is active, according to a report received by the Iron and Steel Division, Department of Commerce, from Assistant Commercial Attaché J. H. Ehlers, Tokio. The demand is attributed to reconstruction activities in and about Tokio and the general construction in progress in other leading Japanese cities. At the moment, the report said, a large part of the business is going to domestic producers, and is stimulating output. The demand for tin plate, black steel sheets, bars and rods, bolts and nuts and structural shapes was declared to be active with stocks on hand rated as normal, except for black steel sheets, of which the stocks are reported low.

British Iron and Steel Output Dropped in June

LONDON, ENGLAND, July 16 (By Cable).—Production of pig iron in June was 563,700 gross tons, and that of steel, including castings, was 709,500 tons. Both figures represent a decline compared with May output.

A comparison of the June output with that of the five preceding months of the year, and with the monthly rate for previous years is as follows, in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Av. monthly	855,000	638,600
1920—Av. monthly	669,500	755,600
1922—Av. monthly	408,500	490,100
1923—Av. monthly	620,000	706,800
1924—Av. monthly	609,900	685,100
1925—Av. monthly	519,700	616,400
1926—Av. monthly	203,500	296,700
1927—Av. monthly	607,800	758,200
1928—January	560,600	626,200
1928—February	550,800	764,400
1928—March	592,600	793,300
1928—April	555,000	644,100
1928—May	591,500	752,700
1928—June	563,700	709,500

Mechanical Engineers Meeting at St. Paul and Minneapolis

For the summer meeting of the American Society of Mechanical Engineers to be held at St. Paul and Minneapolis, Aug. 27 to 30, following a cruise of the Great Lakes beginning at Buffalo on Aug. 20, the papers to be read include the following:

The apprentice training program of the Tri-Cities manufacturers by S. M. Brah, and "Does Mass Production Lessen the Need for Trade Skill?" by H. A. Frommelt.

Mechanical engineering in the iron ore industry, by Anton Taneig, and the use of electric power in iron mining, by Allan C. Butterworth.

An investigation of insulated walls, by F. B. Rowley.

Low temperature distillation of low grade fuels, by Max Toltz, modern developments in the coke industry, by A. R. Powell, and mechanical engineering in coal mines, by E. McAuliffe.

Institute of Metals to Meet in Germany

The council of the Institute of Metals has accepted an invitation from the Verein Deutsche Ingenieure and the Deutsche Gesellschaft für Metallkunde to hold next year's autumn meeting of the institute in Germany. The meeting will take place in Düsseldorf. It is expected to prove very attractive not only to British members but also to members resident in Continental countries. The latter often find it difficult to attend meetings in the British Isles but, as was proved on the occasion of the institute's gatherings held in Ghent and Liége, they come freely to meetings held on the Continent. The meeting will be the first to be held in Germany by the Institute of Metals.

National Metal Exposition in October

The National Metal Exposition to be held in Philadelphia the week of Oct. 8 under the auspices of the American Society for Steel Treating promises to prove a fitting companion to the nine previous expositions, says W. H. Eisenman, secretary.

The Detroit Show last year marked a high water point as far as actual space used, which was in the neighborhood of 93,000 sq. ft., while the maximum capacity at Commercial Museum is approximately 80,000 sq. ft. The exposition will cover ferrous and non-ferrous field, heat treating equipment, small tools, machinery, forging equipment, inspection, handling and welding equipment.

Approximately 10,000 sq. ft. will be devoted to an exhibit of welding supplies and equipment. A definite portion of Commercial Museum has been set aside for this feature of the exhibit and is to be carried on in cooperation and under the auspices of the American Welding Society, which association will hold its annual fall meeting in Philadelphia the same week as the exposition.

The Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers will again hold its fall meeting at Philadelphia during the same week.

Meetings of New England Foundrymen

The New England Foundrymen's Association was the guest of the Worcester, Mass., members at the July 11 meeting at Edgemere Lodge, Lake Quinsigamond, Worcester. F. F. Newcomb, Pilling & Co., was general chairman of arrangements. H. A. Davis, Freemont Casting Co., Worcester, was in charge of reception arrangements; Harry H. Warner, Arcade Malleable Iron Co., Worcester, took charge of sports; while Richard Powers, R. P. Powers Foundry, Worcester, was in charge of the older members of the organization. Transportation problems were cared for by Harry MacDonald, Reed-Prentice Co., Worcester.

Informal announcement was made during dinner that the August meeting of the association will be held in Providence, R. I., where a shore dinner and sports will be enjoyed. Charles F. Miller, president, and Fred F. Stockwell, secretary, both stated that present plans call for an interesting business meeting at the Exchange Club, Boston, on Wednesday, Sept. 12.

To Study Metallurgy and Coal Mining

Fourteen research studies in coal mining and metallurgy will be carried on during the ensuing college year by the Carnegie Institute of Technology, Pittsburgh. They will be the work respectively of 11 research fellows, a research engineer, an assistant research engineer and an analyst, all of whom have been appointed by the institute. The research fellows will be candidates for the degree of master of science.

Among the metallurgical subjects will be the cause and control of abnormality in case-carburized steel, formation and identification of inclusions, distribution ratio of iron oxide between slag and metal, method of determining inclusions, viscosity of open-hearth slags, and three studies in plant work relating to the physical chemistry of steel making.

Bituminous coal raised in the week ended July 7—a five-day week—is reported by the United States Bureau of Mines at 6,837,000 net tons. This was at the somewhat lower daily average than for the two preceding weeks. For the calendar year to July 7 the total was 241,126,000 tons, a loss of almost 15 per cent from the same period last year.

Smaller Shipments of Enameled Sheet-Metal Ware

Shipments of enameled sheet-metal ware in May are reported by the Department of Commerce at 384,501 dozens, valued at $1,304,182. This is the lowest figure since January, comparing with 351,034 dozens in April, valued at $1,329,929. It represents a considerable increase, however, from a year ago, when the total was 318,071 dozens, valued at $1,103,693. The May total was greater than any month in 1927, except for February and March. The enameled ware included consists of cooking, household and hospital utensils, having a vitreous coat on a sheet steel or iron base. It does not include equipment such as stoves, heaters, signs, etc.

What the Railroads Did in 1927

Statistics of common carriers for the calendar year 1927 have been issued by the Interstate Commerce Commission in a 28-page pamphlet, going into a great variety of information. Operating revenues for all roads totaled $5,985,857,014, almost 80 per cent of which was from carriage of freight. Miscellaneous revenues brought the grand total to $6,134,537,524. Operating expenses aggregated $4,572,632,285, to which taxes added $376,090,250. Net operating income was $1,067,915,340, which represents less than 4½ per cent on the reported investment of $24,463,367,010.

Revenue freight carried aggregated 2,361,941,419 net tons, of which 97.22 per cent was in carload traffic and 2.78 per cent in less-than-carload freight. Revenue freight originated aggregated 1,281,064,954 tons, of which less-than-carload items accounted for about 3 per cent. The average loading of carload traffic was 35.13 tons to the car.

Paying Men for What They Do

Department heads of the A. O. Smith Corporation, Milwaukee, receive a bonus determined upon the efficiency of their departments. The bonus markings are based on the production, the cost, and the quality of the work. This is found to create a healthy competition among them and also makes the job of foreman a very desirable one.

The result is that all departments are run in an efficient and business-like manner.

The foremen hold monthly meetings at the plant at which addresses are delivered, generally on industrial subjects. A large moving picture machine is available for illustrated lectures. Special efforts are made to foster a friendly feeling among the foremen and between the foreman and the workmen.

To Appraise Obsolescence of Machinery

Department of Commerce to Study Conditions Affecting Cost-Accounting Allowance for This Factor

WASHINGTON, July 17.—Determination of the amount of obsolete industrial equipment, and its importance as a factor in the inability of firms manufacturing similar products to compete on an equally profitable basis, is one of the objectives of a requested survey to be undertaken by the Department of Commerce. It will be conducted under the immediate direction of H. C. Dunn. Replacement of machinery which in point of service may have many years of usefulness, but which in point of satisfying the latest fancies of the consumer market is obsolete, is an important matter for the manufacturers and one which is behind the request for the study, said Mr. Dunn. A sample survey will first be made to develop the plan of procedure and to learn what obstacles must be overcome.

Obsolescence merits a definite understanding, Mr. Dunn pointed out, especially that it may not be confused with depreciation. It was explained that the obsolescence of factory equipment is effected largely by style changes or by the new product of inventive genius, and not by wear and tear, which are factors in depreciation.

To distinguish between obsolescence and depreciation, and to explain the object and plans for the industrial equipment survey, Mr. Dunn made the following statement:

The practical value of this study would probably be a truer accounting for obsolescence as a hazard, rather than an arbitrary compromise with depreciation, as at present. Wear and tear, or depreciation, is a scientific measurement and can be determined accurately in cost accounting. Obsolescence is analogous to fire as a risk. It cannot be predetermined any more than the date a building will burn can be determined. An arbitrary basis of accounting for the two factors does justice to neither, and fails in adequately providing a fund for replacing machinery when its value has been destroyed by its being worn out or rendered obsolete.

If obsolescence is defined as representing the deadline beyond which a machine cannot compete profitably with another machine, none of the machine's value is destroyed until the deadline is reached; then the value is destroyed all at once. Depreciation approaches its deadline by gradual and constantly diminishing value. Therefore, the two cannot accurately be confused.

Natural caution and conservatism prompts us to hang on to methods and equipment long after the period of their greatest usefulness or profitableness is ended. Facts and information are probably the greatest factors for providing the assurance and courage necessary to discard the obsolete and inaugurate the new. At present, no facts or information seem available to the public generally.

Some of the more ingeniously managed concerns have data and policies concerning obsolescence, but this only accentuates the inability of others to continue satisfactory profits. The market price established by the most efficient is a difficult goal for the less efficient to achieve. Probably the most stabilizing and most profitable competitive condition is when all are as efficient as the most efficient. Therefore, whatever can be done to approach this end should have practical value.

South America Large Buyer of Airplanes

WASHINGTON, July 17.—Almost one-third of the American exports of aeronautical products goes to South America, considered the most potential market for aviation sales by the Transportation Division, Department of Commerce. In the past three years South America has bought $1,204,585 worth, or 32 per cent of the $3,715,000 of United States aviation products shipped abroad. Argentina, one of the important markets for American aeronautical products, bought $246,000 worth in the past three years, including 32 airplanes, valued at $215,037. Peru, however, far exceeded Argentina's purchases in the past few years. From 1925 through 1927 it imported a total of $468,871 worth of American aircraft products, including 15 planes, valued at $280,196. Chile has imported $278,518 worth of American aircraft products, including eight planes, valued at $215,500. Brazil has bought $90,628 worth the past three years, including 12 planes, valued at $78,264, and Colombia has purchased $114,275 worth, including four planes at $97,769. Bolivia and Venezuela are other good South American markets.

Ore Shipments Low for Year but June Cargoes Gain

Shipments of iron ore from the Lake Superior region totaled 8,926,216 tons in June, a gain of 467,350 tons, or more than 5 per cent above the 8,458,866 tons shipped from upper Lake ports in June, 1927. However, the total for the season to July 1 fell off 3,476,298 tons, or nearly 20 per cent compared with the 17,771,423 tons shipped up to July 1, last year. Shipments by ports and for the season in 1928 and 1927 have been as shown below, in gross tons.

American Shipping Losing Ground

Net tonnage of American ships entering American ports with cargo in April is reported by the Department of Commerce at 1,611,729, a reduction of almost 20 per cent from April, 1927, when 1,979,195 tons entered. Practically all of this tonnage loss of American ships was made up by gains in foreign tonnage entering American ports with cargo. A year ago the figure was 2,515,588, which now has become 2,831,673, or an increase of 12 per cent. The foreign tonnage last year was less than 56 per cent of the total. This year it is 63¾ per cent of the aggregate.

Metal-Working Plants Use More Electricity

Steel plants used 4.2 per cent more electric energy in June than a year earlier, and other metal-working plants reported an increase of 17.2 per cent, according to figures compiled by *Electric World*. Automobile manufacturing plants showed a gain of 31.4 per cent, the largeness of which was due in considerable measure to the fact that the Ford plant was practically out of operation a year ago. Textile and lumber plants, on the other hand, were operating below the figure of June, 1927, by 11.9 and 3.7 per cent respectively. Taken as a whole, manufacturing plants showed a gain of 3.5 per cent over June, 1927, but a reduction of 2.2 per cent under May, 1928.

For the first half of the year the index is given for all industrial groups at 119.8, compared with 116.5 in the first half of 1927. The metal industries group for the first half shows 124.2 against 116.3 last year; rolling mills and steel plants, 126.8 against 112.6 last year; other metal-working plants, both ferrous and non-ferrous, 121.7 against 109.6 last year. Automobile plants for the first half show 141.9 against 110.9, while shipbuilding plants record a heavy reduction, having only 88.5 this year against 127 last year.

MOVEMENT OF LAKE SUPERIOR ORE

Port	June, 1928	June, 1927	To July 1, 1928	To July 1, 1927
Escanaba	831,478	928,471	1,468,202	1,862,299
Marquette	558,212	459,315	875,248	930,628
Ashland	1,235,019	1,113,151	1,868,775	2,309,186
Superior	2,423,990	2,325,965	3,953,793	4,822,434
Duluth	2,899,024	2,718,446	4,568,912	5,893,872
Two Harbors	978,492	913,518	1,560,195	1,953,004
Total	8,926,216	8,458,866	14,295,125	17,771,423
Increase	467,350	.....	.....	.....
Decrease	.....	.....	3,476,298	.....

Notable Activity in New England

The New Britain Machine Co., New Britain, Conn., is operating its special machine and machine tool departments on a day and night schedule. Practically 50 per cent of the plant is operating on such a basis. The company has a comfortable backlog of orders, largely from the automobile industry.

The Chapman Valve Mfg. Co., Springfield, Mass., reports more business the first five months of this year than in the last five months of 1927, and indications are 1928's turnover will be as large and probably larger than 1927's. Competition is more severe than it was in the immediate past, with no proportionate decrease in costs.

The Coburn Trolley Track Mfg. Co., Holyoke, Mass., is operating at about 50 per cent of capacity with business prospects somewhat better than they were the first four or five months of this year. Customers are buying conservatively. No material change in prices for their product is anticipated. A few items have advanced slightly, and a few are lower

E. P. Bullard, president Bullard Machine Tool Co., Bridgeport, Conn., states that the company did more business during the first half of 1928 than in the whole of 1927. The company is pushing sales of new machines, and is buying new machine tool equipment. It has sufficient business on its books today to keep the plant running at capacity the remainder of 1928.

To Dismantle Four Blast Furnaces

YOUNGSTOWN, July 17. — To save taxes and reduce maintenance, the Youngstown Sheet & Tube Co. is to dismantle two blast furnaces and its by-product coke works at Mayville, Wis. The Tod blast furnace at the Brier Hill works, Youngstown, built in 1889 by the old Youngstown Steel Co., is to be torn down, while one of the blast furnaces in the South Chicago battery is also to be demolished, both because of obsolescence. This will leave the company two stacks at South Chicago and a total of 14 at all points. When the two blast furnaces at Mayville are operated, coke will be secured from nearby producers.

Last week, officials and directors of the company conducted a three-days inspection of the Sheet & Tube properties, headed by President James A. Campbell. Improvements now under way are progressing satisfactorily, it was ascertained, including the new by-product coke plant installation at South Chicago and the new boiler and power plant at the Campbell works.

President Campbell predicted increased operations and larger employment, following the trip. Those who participated included Vice-Presidents H. G. Dalton, Cleveland; W. C. Reilly, Walter E. Watson, C. S. Robinson and W. J. Morris, Youngstown; Walter E. Meub, secretary-treasurer; and the following directors: Harry Coulby, Cleveland, A. E. Adams, Richard Garlick, John Tod and John W. Ford, Youngstown.

Recent steel buying has been satisfactory, making the fall outlook favorable, says President Campbell. Second-quarter earnings will be slightly better than those for first quarter. The company's tin mills at Indiana Harbor have been operating in full for some time and it is showing good earnings from its zinc properties.

Bin Improvements for Joliet Blast Furnaces

A new stock house and material handling system will be erected by the Illinois Steel Co. at its Nos. 3 and 4 blast furnaces at Joliet, Ill. The stock trestle and bin structure will be approximately 400 ft. long and will include two coke bins and 39 ore and stone bins of the Baker suspension type, equipped with McKee special continuous opening segmental hand operated gates. Three larry cars of late design will also be provided. The contract for the extensions and equipment has been awarded to Arthur G. McKee & Co., engineers and contractors, Cleveland.

Employment High in June in Ohio

With the one exception of March, 1928, employment in the iron and steel industries of Ohio during June was the greatest since November, 1926, the index figure standing at 102, with an average month in 1923 taken as 100. The number of wage earners increased 1 per cent from May and 6 per cent from June, 1927, the betterment being shared by 30 of the 58 reporting companies. In Cleveland employment was 10 per cent greater than in May and 38 per cent greater than in June, 1927. In the machinery group June employment was the highest since May, 1927, and was 2 per cent greater than in May. The increase was shared by 103 of the 190 reporting concerns. These figures are taken from the current issue of the bulletin published by the Bureau of Business Research of Ohio State University.

New General Electric Co. Protective Cream

The reseach laboratories of the General Electric Co. have developed a protective hand cream for hands and arms which are exposed to oil, grease, dirt, varnish, paint and other causes of skin discoloration and irritation encountered in industrial processes. It is applied before beginning work and forms an invisible film which quickly dries and is not slippery. Subsequent washing in warm water removes the film. The cream has been placed on the market by the merchandise department of the company at Bridgeport.

Disston Company to Consolidate Subsidiaries

Plans are being arranged by Henry Disston & Sons, Inc., Tacony, Philadelphia, for a consolidation of its manufacturing subsidiaries into one organization of enlarged proportions, under first noted name. The amalgamation will include Henry Disston & Sons Iron & Steel Works and Henry Disston & Sons File Co. The succeeding organization, Henry Disston & Sons, Inc., will carry out an increase in capital from $6,000,000 to $10,000,000, to provide in part for consolidation and expansion. A meeting of stockholders has been called for Sept. 14, to approve the proposition.

Heavier Production of Portland Cement

Portland cement production in June is reported by the United States Bureau of Mines at 17,469,000 bbl., a gain of 1 per cent over the May figure of 17,280,000 bbl. and a similar gain over June, 1927, when production was 17,224,000 bbl. While the June production was the highest for that month ever recorded, it falls short of the high figures of August and September of last year, standing third in all the months we have had.

Shipments in June fell 3 per cent below the preceding month, having been 18,421,000 bbl. against 18,986,000 bbl. in May. The current figure is 7 per cent lower than that for June last year, when shipments amounted to 19,761,000 bbl., and was lower also than the 19,134,000 bbl. of June, 1926. For the first half-year, production of cement has aggregated 77,005,000 bbl., compared with 75,058,000 bbl. last year. A new record has been made, therefore, as no previous half-year reached the totals now recorded.

Reduction in Trackwork Output

Production of trackwork for T-rail track of 60 lb. and up is reported for June by the American Iron and Steel Institute at 13,716 net tons. This represents a reduction of about 3 per cent from the total for May, at 14,141 tons, and it is nearly 6 per cent below the figure for June, 1927, at 14,557 tons. Except for May and March, however, the June total is the highest since June, 1927.

Aggregate production for the second quarter of the year was 41,368 tons. This is the largest total since the corresponding quarter of last year, at 48,406 tons. For the first quarter of this year the amount was 35,761 tons.

The J. M. Carpenter Tap & Die Co., Pawtucket, R. I., has passed out of existence, and a new corporation under the same name incorporated. The original company is now known as the Carpenter Holding Co. Elisha C. Mowry is president.

Fabricated Structural Steel

New York Subways Will Take 15,000 Tons—13,000 Tons Placed for Manhattan Office Building

FOR the third consecutive week awards of fabricated structural steel totaled more than 42,000 tons, lettings during the past seven days having just passed this figure. Outstanding awards were office buildings in New York and Baltimore, taking 13,000 and 7700 tons respectively, and a 3000-ton theater job in Atlantic City. Including 15,000 tons needed for two sections of the New York subway, new projects amounted to 36,700 tons. Other large projects reported were a Milwaukee office building calling for 4000 tons and a municipal drainage project at Oakland, Cal., requiring 4500 tons of plates. Awards follow:

BOSTON & MAINE RAILROAD, 2300 tons, bridges at Saco and Biddeford, Me., and Haverhill, Mass., to Phoenix Bridge Co.

BOSTON & MAINE RAILROAD, 800 tons, bridge at Salmon Falls, Me., to Boston Bridge Works.

PITTSFIELD, MASS., 125 tons, bridge, to Palmer Steel Co.

BOSTON, 165 tons, office building at 8 Newbury Street, to New England Structural Co.

NEW YORK, 13,000 tons, Western Union Building, to Post & McCord, Inc.

NEW YORK, 2300 tons, office building on John Street for New Amsterdam Casualty Co., to Taylor-Fichter Steel Construction Co.

NEW YORK, 500 tons, building in Bronx for Borden's Farm Products Co., to National Bridge Works.

PENNSYLVANIA RAILROAD, 700 tons, freight station at Trenton, N. J., to Belmont Iron Works.

PHILADELPHIA, 800 tons, St. Luke's Hospital, to Montgomery Iron & Steel Co.

PHILADELPHIA, 1000 tons, insurance building at Fourth and Walnut Streets, to American Bridge Co.

ATLANTIC CITY, N. J., 3000 tons, Embassy Theater, to an unnamed fabricator.

BALTIMORE, 7700 tons, building for Baltimore Trust Co., to McClintic-Marshall Co.

WASHINGTON, 250 tons, train shed for Pennsylvania Railroad, to unnamed local company.

WATERVILLE, N. C., 485 tons, Phoenix Utility Co., to Virginia Bridge & Iron Co.

BIRMINGHAM, 177 tons, Seaboard Air Line Railroad, to Virginia Bridge & Iron Co.

BIRMINGHAM, 168 tons, slag bin for Sloss-Sheffield Steel & Iron Co., to Virginia Bridge & Iron Co.

MIAMI, FLA., 100 tons, airplane hangar, to Ingalls Iron Works Co.

BATON ROUGE, LA., 700 tons, Standard Oil Co., to Virginia Bridge & Iron Co.

BUFFALO, 400 tons, Mayflower apartment building, to Kellogg Structural Steel Co.

NEW YORK CENTRAL RAILROAD, 300 tons, bridge at South Bend, Ind., to McClintic-Marshall Co.

CHICAGO, 150 tons, building for Dallas Copper & Brass Co., to Gage Structural Steel Co., local.

CHICAGO, 525 tons, building for Robert O. Law, to Mississippi Valley Structural Steel Co.

CHICAGO, 1000 tons, two public schools, to Eggers Schillow Co., local.

CHICAGO, 200 tons, Interstate Iron & Steel Co., plant addition, to American Bridge Co.

MARINETTE, WIS., 850 tons, Interstate bridge over Menominee River, to Wisconsin Bridge & Iron Co.

KOHLER, WIS., 500 tons, dry kiln addition to pottery plant of Kohler Co., to Worden-Allen Co.

KEWAUNEE, ILL., 500 tons, boiler house for Kewaunee Boiler Co., to Worden-Allen Co.

NEKOOSA, WIS., 125 tons, finishing room for Nekoosa-Edwards Paper Co., to Lakeside Bridge & Steel Co.

GREEN BAY, WIS., 750 tons for Northern Paper Mills, to Worden-Allen Co.

SAN FRANCISCO, 275 tons, A. M. Castle Co. warehouse, to Pacific Coast Engineering Co.

SAN FRANCISCO, 120 tons, apartment building on Pacific and Webster Streets, to McClintic-Marshall Co.

OAKLAND, CAL., 350 tons, apartment building on Lakeshore Boulevard, to Herrick Iron Works.

OROVILLE, CAL., 450 tons, Lincoln and Huntoon Street viaducts for Western Pacific Railroad Co., to unnamed Eastern fabricator.

ALAMEDA, CAL., 120 tons, hangars for Alameda Airport Co., to Herrick Iron Works.

SACRAMENTO, CAL., 100 tons plates, 24-in. riveted pipe line for city, to unnamed pipe fabricator.

SANTA BARBARA, CAL., 125 tons, church, to McClintic-Marshall Co.

SAN BERNARDINO, CAL., 125 tons, Pioneer Trust & Savings Bank Building, to Union Iron Works.

LOS ANGELES, 138 tons, apartment building at 840 South Hobart Street, to Philip Freidman & Son.

LOS ANGELES, 250 tons, apartment building at Franklin and Gramercy Place, to Pacific Iron & Steel Co.

RENO, NEV., 106 tons, Odd Fellows' lodge, to Schrader Iron Works.

PHOENIX, ARIZ., 175 tons, city hall, to Minneapolis Steel & Machinery Co.

MANILA, P. I., 120 tons, apartment building, to Judson-Pacific Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

WEYMOUTH, MASS., 525 tons, power house addition.

CAMBRIDGE, MASS., 225 tons, hospital addition.

LAWRENCE, MASS., 150 tons, Champion International Co. power house.

NORTHFIELD, VT., 225 tons, Norwich University armory.

DURHAM, N. H., 250 tons, chemistry building.

PROVIDENCE, R. I., 1200 tons, Washington Bridge; Merritt-Chapman & Scott Corporation, New York, general contractor.

NEW YORK, 15,000 tons, subway work; 4000 tons for section 1-A, route 8 and 11,000 tons for section 1, route 108.

STATE OF NEW JERSEY, 400 tons, highway bridges.

PENNSYLVANIA RAILROAD, 300 tons, bridges.

AKRON, OHIO, 500 tons, East Center bridge, probably will be awarded to Burger Iron Co.

INDIANAPOLIS, 1200 tons, Methodist Hospital.

INDIANAPOLIS, 350 tons, plant building for Link-Belt Co.

CHICAGO, 1850 tons, five junior high schools for Board of Education.

MILWAUKEE, 2500 tons, A. O. Smith Corporation pipe shop; bids to be let this week.

MILWAUKEE, 200 tons, addition for International Harvester Co.; bids close July 23.

MILWAUKEE, 4000 tons, addition to building for Northwestern Mutual Life Insurance Co.

ST. LOUIS, 700 tons, plant for Century Electric Co.

LINCOLN, NEB., 200 tons, Nurses' home; bids in.

SAN FRANCISCO, 200 tons, shapes and rail steel for vault at United States mint; bids being taken.

SAN FRANCISCO, 600 tons, apartment building at 2160 Pacific Street; bids being taken.

OAKLAND, CAL., 4500 tons of plates for East Bay Municipal Utility District; bids Aug. 17.

SANTA CLARA, CAL., 140 tons, bridge at Sargent; bids Aug. 1.

SACRAMENTO, CAL., 455 tons, bridge at Saugus; bids Aug. 1.

VENTURA, CAL., 570 tons, Barsdale bridge; bids July 24.

SAN DIEGO, CAL., 253 tons, bridge over Sweetwater River; bids July 16.

SEATTLE, 195 tons, Second Avenue viaduct extension; bids July 27.

New Trade Publications

Boiler Return Trap.—Vapor Heating Co., York, Pa. Four-page bulletin, B-139, describing and illustrating the new Broomell direct boiler return trap for vapor pressure, vapor vacuum and one or two-pipe systems of steam heating on which the return ends of radiators are equipped with thermostatic traps, operating at 20 lb. boiler pressure or less. Simplicity of construction is a feature. The operating mechanism is inside the body of the trap, above the water line. Inlet and vent ports are non-corrosive, and are positioned so that they will not gather foreign matter. The device is entirely automatic and a pump is not required. It may be used in correcting defective straight steam jobs and in connection with pressure reducing valves when the boiler pressure does not exceed 20 lb.

Electric Motors.—Wagner Electric Corporation, St. Louis. Bulletin No. 156, describing the sleeve bearing and the ball bearing construction used on Wagner motors. The sleeve bearings are completely sealed against dust and dirt and the ball bearing is of double cap type, to facilitate replacement and servicing.

Presses.—Niagara Machine & Tool Works, Buffalo, N. Y. Bulletin No. 64-C, 44 pages, devoted to the series No. 60 double crank power presses. Features of construction are described and illustrated and specifications on all types are given. A section is also devoted to modifications and special features of these machines. Foot presses and screw presses made by the company are described in bulletin No. 68, also recently issued.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Cross Currents in Steel

OUR next annual presentation of where steel went, in the year now half passed, is going to prove very interesting, for there have been various cross currents. It is a matter of statistical record that ingot production in the first half of this year ran 3 per cent above that in the corresponding period of 1926, the record year; but by no means does this indicate that the various consuming lines each made a similar showing. There were some substantial losses and there were some still larger gains. Passing lightly over 1927, which was badly off in its second half, though almost matching 1926 in its first half steel production, comparisons may be made between 1926 and this year to date.

There have been material decreases in consumption of steel by the railroads and in the oil and gas fields. The highest railroad percentage of total steel consumption in the six years covered by the diagram in THE IRON AGE, Jan. 5, 1928, page 6, was 28 per cent, in 1924, but the tonnage had been greater in 1923. Then there was 25 per cent in 1925, 23½ per cent in 1926 and 19 per cent in 1927. There are chances of the proportion running under 19 per cent this year.

Oil, gas, water and mining were shown at 9½ per cent for 1926 and 8½ per cent for 1927. There was much drilling in 1926 and little in 1927, but a great deal of line pipe work. There is little drilling this year and there was little line pipe business until a few weeks ago. The general proportion seems likely to drop somewhat.

Agriculture's consumption of steel has moved, broadly speaking, in the opposite direction from railroad consumption, for it was only 3 per cent of 1924's light production of steel, increasing to 3½ per cent and then 4 per cent in the next two years of increasing steel totals, while last year it was 5½ per cent. For this year we may expect a still larger percentage.

Automobile and truck production to date is only slightly behind 1926 and there are good chances of the difference being made up. The proportion will not differ greatly from the 14½ per cent reported for 1926.

Each year since 1922 has shown an increase in the proportion of steel passing into building construction, there being a slight backset in percentage though not in tonnage in 1925. The proportion was 15 per cent in 1922 and 22 per cent last year. All the indications are that this year's percentage will show a further increase. Undoubtedly the ratio of steel to total of building operations has been gaining in a very substantial way.

With changes in the distribution of steel to different consuming lines, the industry has no difficulty in putting its steel into the respective finished forms called for, despite the fact that mill equipment is highly specialized. Steel ingots were produced during the first half of this year at 84 per cent of rated capacity, which is a high proportion; but no finishing department was strained, for the sum total of finishing capacity well exceeds the total ingot capacity.

There is no likelihood of any individual finished steel product becoming scarce, but when such changes are seen in the relative requirements of different consuming lines one wonders what things would be like if all the consuming lines should chance to do their best in the same year. Competition makes the gap between total demand and total capacity seem large, but the statistics do not. A 16 per cent margin cannot be called large, generally speaking, yet it is sufficient to keep prices from working into a position that could fairly be described as firm, in the old-time sense.

From Servants to Services

POPULAR writers like to measure modern mechanical power in terms of millions of slaves. The days of slavery are over and, in this country, the era of cheap servants is past. Mass production, by providing at low cost devices which minister to personal comfort and pleasure, has eliminated to a large extent the need for a serving class.

Growing efficiency in manufacture reduces the number of workers required for a given output, creating "technological" unemployment. Employees released by industry are being absorbed in other pursuits, notably luxury industries and the purveying of personal services. In the new sense service consists essentially of organized or wholesale methods of satisfying wants, in contrast with the individual attention rendered by household servants. In the cities apartment hotels relieve their occupants of all the cares of housekeeping, supplying maid and valet service and restaurants. Laundries, hair-dressers' shops, tea rooms, delicatessen shops and cleaning and pressing services are all increasingly used as people become better able to rid themselves of household drudgery. Likewise automobile laundries, repair shops and service stations are doing for the motorist what he formerly did for himself.

A kindred development of the times is the demand for more service in the distribution of products. Packaging, quick delivery in small quantities and other demands made upon the retailer increase the

cost of distribution but add to the convenience or desirability of commodities. According to Magnus W. Alexander, president of the National Industrial Conference Board, this form of service becomes in essence a refinement of the product.

The growth of services, although in many cases resulting in higher costs, does not necessarily mean economic waste. It rather signifies greater specialization in occupations, allowing the individual more time for his own vocation or for leisure and avocations. While there may be disagreement as to what properly are services as distinguished from extravagances, there can be no doubt that they betoken a rising standard of living. Mass output has not only helped solve the servant problem, but it has also made possible a wider enjoyment of organized services and brought to increasing numbers of people some of the best material satisfactions of life.

"Go South, Young Man, Go South"

"COMPANY towns," "mill towns" and coal mining camps are all too frequently aggregations of unkempt shanties, and the inhabitants gradually acquire the same state of dishevelment. Of course there are exceptions and fortunately their number is growing. In all industries and in all States are model towns which must be the envy of their neighbors and undoubtedly attract the highest type of residents. In this way the practical philanthropy behind the town-planning scheme reaps handsome dividends in a decreased labor turnover, a better-than-average skill throughout the working force, and a cheerfulness and contentment which comes from good home surroundings.

Of course, the danger of paternalism must be avoided. But it is apparent to anyone who travels through the newly developing region in North Carolina that a safe middle course can be steered. Here are dozens of little communities, each containing several hundred cottages, clustering about a spinning or a weaving plant. Nature is kind, and only a little effort is needed to adorn the premises with flowers, shrubs and shady arbors. While some of the villages are so new the first coat of paint has hardly been weather-beaten, yet the general impression given by all of them is one of thrift, cleanliness and wholesome living.

A new name should be invented for them. They are so much different from the "mill towns" of New England that the term does not apply. It would be like putting a rose bud and a cockle burr in the same classification.

Freight Car Buying—When?

AT intervals in the years just after the war, car builders gave out estimates of the rate at which the railroads would need to place equipment orders if they were to make up for the running down of their properties under Government control. In the fall of 1924 the country was full of prophecies of prosperity, in view of the approval of the Coolidge administration at the national election. As their contribution to the favorable forecasts, the car companies at that time said that the railroads should buy not less than 200,000 cars a year in the next five years to bring their rolling stock up to standard in freight-moving capacity.

The 1924 prophecies of business activity on a large scale have come true in the past four years, and in the expeditious handling of the large volume of freight the railroads have made a record to which their spokesmen have pointed with proper pride and on which business reviews have commented again and again. But far from making up for their under-buying in the years of Government operation, the railroads have been but poor patrons of the equipment companies.

In the three years following 1924 the total of freight cars built for domestic use was about 258,000, or an average of 86,000, little more than 40 per cent of the estimated annual requirement of 200,000 cars, and a trifle less than the average of 87,650 cars built in the five years preceding 1924. Among all the years since the war 1923, with a total of 175,748 freight cars built, stands alone in making any close approach to the 200,000-car average of the car builders' forecast of late 1924. Since 1923, as shown by the following figures of *Railway Age*, there has been a steady decline in freight car building, especially marked in 1926 and 1927:

Freight Cars Built for Domestic Lines

1919	94,981	1924	113,761
1920	60,955	1925	105,935
1921	40,292	1926	88,862
1922	66,289	1927	63,390
1923	175,748		

Somewhere an upward turn, in compensation for the lean buying of so many years, is to be looked for; but 1928 has been without any indication of it thus far. Roundly, new freight cars ordered in the past six months were 28,000, as against 42,000 in the first six months of 1927. The record of cars placed in service this year makes even a less favorable showing. For the five months ended May 31, this number was only 21,873, whereas the first five-months' average for the four years 1924-27, as given by *Railway Age*, was 48,800.

The steel industry has one satisfaction from such a showing: Having fared so well this year at the hands of buyers other than railroads, and on a scale that in these other lines gives better promise for the second half than existed a year ago, the inevitable change for the better in railroad demand, should it come this year, will make the round-up for 1928 appreciably better than the best predictions of six months ago.

Steel's Recuperative Powers

A CHARACTERISTIC of the steel industry is so familiar that it may not be identified—its power of recuperation. Often one has heard of a trade or a market going from bad to worse. Steel never does that for any length of time. Always it has recuperated. Its long history has been one of repeated recuperation. It has had its downs and ups, but the latter have always been the greater.

Steel producers themselves have always been noted for optimism. Perhaps that is due largely to the fact that the industry is of such a character as to attract to its ranks men born with sanguine temperament. One of the greatest of these was Andrew Carnegie, and it is no slight to his memory to point out an instance where even he apparently failed to make full allowance for steel's recuperative power. In 1898, on the eve of his departure for an Egyptian trip (his wont was

to talk about business on leaving the country rather than on arriving), he predicted a great tonnage future for steel because it could be sold three pounds for two cents, meaning $15 billets, whereas in the next year billets sold for $40 and scrap rails brought more than the cost of the new rails contracted for in the previous year. The steel industry had seemed overbuilt, promising success only to the lowest cost producers, for in the same interview Mr. Carnegie intimated that no concern with bonded indebtedness stood much chance. Afterward he became quite a bondholder himself.

We need not trace the ups and downs that have come since, in both tonnage and prices. Times change, and styles with them, but the power of recuperation in steel remains. What is to the point is to observe how the principle has been working out in recent months in a new way befitting these new times. In the last quarter of last year steel earnings were very poor. Tonnage was light and prices were too poor to yield an adequate return even on a reasonably full tonnage. Things seemed to be going from bad to worse; but promptly tonnage increased. Last year showed the poorest fourth quarter production of steel since 1921, and now this year has shown the largest first half production on record.

At the same time steel prices improved. The hasty opinion would be that they improved purely because tonnage had increased, and later, say on April 1, there were those who judged that the whole thing made a poor showing, by a reasoning that the price improvement was not commensurate with the tonnage improvement, from which it would seem to follow that when tonnage went the other way prices would go the other way still faster.

What the trade has since been permitted to see does not support that view. Steel prices have stood the test of seasonal decline in demand better than those observers expected. Sellers have shown greater ability to hold their prices than their conduct in fair weather had suggested. Confronted by a real emergency, the industry rises to the occasion. It does not secure in the long run what would seem to be a reasonable return on its investment; yet it is always fully capable of keeping out of serious trouble.

Bond Between Slag and Cements

In addition to the four pamphlets issued by the National Slag Association, 937 Leader Building, Cleveland, containing information on various properties of iron blast furnace slag, noted on page 98 of THE IRON AGE for July 12, a fifth has just appeared entitled "Bond in Slag and Slag Concrete." It contains 28 pages of quotations from published articles or addresses, each excerpt giving testimony about the way crushed or granulated slag unites with cement, tar, bitumen, or other road-making materials. The pamphlet will answer questions properly asked by engineers or constructors when first considering the use of slag for concrete aggregate or for road building.

Wholesale prices from 1890 to 1926 are covered in a 256-page publication (No. 440) of the United States Bureau of Labor Statistics. Copies may be obtained at 60c. from the Superintendent of Documents, Government Printing Office, Washington. Figures are given for a wide variety of products on an annual basis for the entire period, and month by month through 1925 and 1926. The principal items are shown also in graphic form over a number of years.

CORRESPONDENCE

Tracing Billets Through Marks on Ingots

To the Editor: Some time ago we made an effort to find a method of marking ingots which would carry through into a 4 x 4-in. billet in such manner that the mark would still be legible. It was important to have this result in identifying steel running through the mill. Various types of paint were used without satisfactory results; the mark was not sufficiently legible after the billet was rolled. A special composition crayon was developed which showed considerable improvement over the paint, but still was not entirely satisfactory.

Someone told me of a case where a small electrically-driven saw is used to make certain marks on the ingots. It was said that these marks are visible after the finished bar is on the hotbed. For steel which is subject to rigid surface inspection, however, I should think that these sawmarks would leave a flaw which could not be permitted. Also it would seem to me that there would be only a limited number of bars possible under this arrangement, because not very many sawmarks could be placed on successive ingots before the different kinds of sawmarks would run out. They might follow the Roman numerals to a certain extent, I suppose.

I wonder if any of your readers can tell of a satisfactory method by which the ingots can be marked so that the identification on the hotbed is positive and without detriment to the quality of the steel. N. S. Y.

Bureau of Mines Studies Ferrous Oxide

Ferrous oxide (FeO) is assumed to be the constituent of so many smelting slags, and to have such important effects upon the quality of pig iron and steel that the Pacific Experiment Station of the United States Bureau of Mines has endeavored to prepare a quantity of it for more thorough examination. Previous experimenters apparently have secured no more than 0.1 gm. The oxide, which is stable at high temperatures, becomes unstable at 500 to 600 deg. C., and even though chilled rapidly through this range, does not retain the desired composition.

To date the best results have been secured by melting magnetite with pure iron in a specially designed vacuum furnace, and chilling rapidly out of contact with air. Even this treatment gives a mass which analyzes no more than 85 per cent FeO.

Index of Steel Treaters' Transactions

A 100-page index of Vol. 1 to 10 (1920 to 1926), of the Transactions of the American Society for Steel Treating, and including Vol. 1 and 2 of the Journal of the American Steel Treaters' Society, has been prepared by Frank T. Sisco of the Army Air Corps and published by the society. The subject matter of these 12 volumes is elaborately cross indexed into more than 12,000 entries. Copies may be obtained from the society, 4600 Prospect Avenue, Cleveland, for $3.

The 1927 Yearbook of the Merchants' Association of New York has been issued in a volume of 343 pages. It covers not only the classified list of 6667 members arranged by type of product, and also in the regular alphabetical list, but features as well the activities of the year in a wide variety of lines. Committee reports cover about 100 pages and deal with such topics as banking, building laws, city planning and transit, street traffic, fire prevention, foreign trade and customs service, harbors and terminals, industrial relations, insurance, public utilities, and transportation.

This Issue in Brief

"A manufacturing concern can be successful only through an unceasing process of growth," says engineer. Well-managed firms are investing a relatively large portion of profits in improved methods, modern equipment and research, rather than paying high dividends. —Page 144.

* * *

Wide aisles permit motor trucks to drive into the factory and deliver parts directly to assembly lines. In this way automobile manufacturer, who has done away with stockrooms, avoids rehandling.—Page 135.

* * *

Abrasion test will enable you to determine how metal parts will stand up in service. By means of an accurately controlled grinding mechanism, in which all conditions as to abrasive, pressure, speed, time and moisture are under operator's control, laboratory tests are obtained which give a reliable index of service qualities.—Page 141.

* * *

From priming coat to completion, enameled parts are untouched by workmen. Continuous enameling conveyor carries automobile parts, from priming tank, through a continuous oven, where the priming coat is baked on. Operation is repeated with a coat of enamel, then parts are inspected and delivered to assembly line.—Page 138.

* * *

Accuracy of analyses for determination of gas in metal is proved by tests of same specimen in three different countries. Analyses of uniform samples of ingot iron, analyzed for oxygen and hydrogen, in United States, Germany and England, produce comparable results.—Page 142.

High operating efficiency and low accident rate go together. Investigator finds that material reductions in accident rates can be had with greater production. Accident rate can be controlled, and in fact it varies less than rate of production per man-hour.—Page 151.

* * *

In designing rolls, the main point of consideration is the temperature of the ingot or billet, as this determines the softness of the metal. Relative sizes of the passes are determined by the comparative plasticity of the metals at rolling temperatures, and not by their hardness or other physical properties when cold.—Page 146.

* * *

Can foundries reduce coke consumption by cooling the reduction zone in cupola? A German foundry claims a considerable reduction in fuel costs by introducing a water spray. This diminishes the formation of carbon monoxide, which is detrimental to economy. —Page 148.

* * *

Forging manufacturer assembles his own furnaces from standard units. From a few sizes of bed, side and end plates, furnaces of varying dimensions are quickly assembled, using tie rod construction and mounting on pipe standards. Instead of being round, burner port is flat, creating a fan-like sheet of flame.—Page 149.

* * *

Where manufacturers fail to obtain adequate profits, how great a factor is obsolete equipment? Department of Commerce will undertake a survey to answer this question. "Natural caution and conservatism prompts us to hang on to methods and equipment long after the period of their greatest usefulness or profitableness is ended," says Department executive.—Page 165.

Where lubrication cannot be maintained, high-lead bronzes show decided advantages. Bronzes with 12 to 25 per cent lead do not wear so rapidly as low-lead bronzes, without lubrication.—Page 142.

* * *

Almost infallible barometer of pig iron prices is described by Doctor Haney. Ratio of pig iron production to steel ingot production, taking into consideration the level of steel prices, reveals the condition of the pig iron market. When the ratio is high, as at present, pig iron is weak in price.—Page 160.

* * *

Demand for steel equals production. Though output is high, requirements of consuming industries keep in step. Steel prices are kept down by surplus producing capacity of the steel industry, says Doctor Haney.—Page 160.

* * *

In resistance to wear, manganese steel outlasts plain carbon steel 10 to 1, abrasion test reveals. Chromium increases wearability of pearlitic steels very little, but nickel increases it to a marked extent.—Page 142.

* * *

High-test cast iron should be made in the electric furnace, not in the cupola. When produced in the cupola, a large quantity of steel must be added, and a powerful blast maintained. Even then it is difficult to obtain a uniform product.—Page 148.

* * *

Have the days of high dividends on industrial common stocks passed? Well-managed concerns are paying dividends about equal to returns on a good bond and are plowing the remainder of earnings back into the business, to insure a continuation of adequate earnings. —Page 143.

Iron and Steel Markets

July Gives Unusual Promise

Bookings Have Taken a Spurt, Though Still Mostly for Immediate Needs—Makers Look to Increasing Tonnage to Help Prices

STEEL business developing in the past week promises to make the month the best July in years. The expansion in an ordinarily dull month, coming after production in the preceding half year had made a record, is broadly surprising. As buyers today still are taking only what they expect to use, the high rate of output so far this year proves there has been continued high consumption, and that accumulations from first-half shipments are negligible.

Producers have reappraised the outlook and, counting on a better volume than seemed likely a few weeks ago, depend on increasing tonnage to help in price betterment.

Meanwhile a movement is gaining favor among the makers to demand completion of specifications on present quarter commitments prior to Sept. 15. Recent laxity in accepting releases against contracts has permitted consumers to get the benefit of a given price well into the succeeding quarter, and the 1.90c., Pittsburgh, quotation on bars and other heavy tonnage products, for example, has only lately applied and on scattered buying. The $2 a ton advance over present asking prices announced last week for fourth quarter business is another signal of the efforts to lift prices. A like advance is now under consideration for cold finished steel bars.

Operations for the industry as a whole are close to 75 per cent, a few points under June, which in turn was less than 10 per cent under the average of the record output of the first six months of the year. At the moment shipments are equal to bookings and in some cases higher, and while there was considerably more third quarter contracting than in this season in 1927, the buying has been in the main for the lighter products, with a dearth of the kind of specifications that make for rolling economies.

Of the major consuming industries, building construction continues highly active, with many of the fabricating shops almost fully scheduled for the rest of the year. The railroads, still silent on cars and locomotives, have made fresh purchases of 65,000 tons of rails, including the Northern Pacific for 25,000 tons and the Great Northern for 8000 tons, in part in both cases for early delivery.

Opinions are mixed that the automobile builders can keep up the present output after Aug. 1, but for the present their taking of alloy steel bars and cold finished steel is heavy and stamping and forge shops are well filled with automobile work. The oil industry is responsible for the large additions to pipe mill order books, with a number of long pipe lines yet to be placed. The agricultural implement makers report the best business in ten years.

Price irregularities are now confined almost solely to sheets. Black sheets appear to be settling down to a rather common 2.60c., Pittsburgh basis, although this quotation only recently appeared. Blue annealed sheets have sold for both 1.90c. and 2c. On galvanized sheets 3.40c., Valley, and 3.50c., Chicago, have been the exception, in some cases explained as a concession of $2 a ton to jobbers.

The reduction made last week in wire products caused a spurt of buying in some centers, but that of $2 in nails, which was a meeting of an existing basis, brought only a moderate response, except that car lot buyers in consuming industries are trying for the jobber price of $2.55 a keg.

Fabricated steel bookings in June represented 81 per cent of capacity, compared with 83 per cent in May, but except for May and July, 1927, they were the largest in several years.

Current fabricated structural steel orders were more than 42,000 tons for the third successive week. Included were office buildings in New York and Baltimore, which took 13,000 and 7700 tons, respectively. New projects call for 36,700 tons, the highest amount in recent weeks. New York subway work accounts for 15,000 tons, while 4500 tons of plates may be required for water mains for Oakland, Cal., though cast iron pipe to the amount of 22,000 tons may be substituted.

Reductions a week ago of 50c. a ton in foundry pig iron at Chicago and in eastern Pennsylvania have not stimulated buying. Foundries are content to cover for early requirements, except the case of an expected purchase of 5000 tons for last half by a sanitary ware manufacturer for its Louisville, Ky., plant.

Scrap is weak in all markets. At Pittsburgh further reductions of 25c. and 50c. a ton on a number of grades, including heavy melting steel, bring prices close to prewar levels.

Export purchases again make up the bulk of railroad equipment buying. Following 1100 freight cars recently placed by an Argentine railroad with American car builders, a Brazilian carrier last week bought in this country 1000 freight cars. And the Argentine road is preparing to inquire for some 60 locomotives. The only important domestic business placed was 250 gondola bodies for the Chicago, Rock Island & Pacific.

Exports from the United States of metal-working machinery were the greatest, in 1927, for seven years.

While THE IRON AGE pig iron composite price remains for a second week at its low of $17.09 a ton, that for finished steel is now 2.319c. a lb., against 2.326c. last week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	July 17, 1928	July 10, 1928	June 19, 1928	July 19, 1927
No. 2, foundry, Philadelphia	$20.26	$20.26	$20.76	$20.76
No. 2, Valley furnace	16.75	16.75	16.75	18.00
No. 2, Southern, Cin'ti	19.19	19.19	19.69	20.94
No. 2, Birmingham	15.50	15.50	16.00	17.25
No. 2 foundry, Chicago*	17.50	17.50	18.00	20.00
Basic, del'd eastern Pa	19.00	19.00	19.00	20.75
Basic, Valley furnace	16.00	16.00	15.35	17.50
Valley Bessemer, del'd P'gh	18.76	18.76	18.76	20.26
Malleable, Chicago*	17.50	17.50	18.00	20.00
Malleable, Valley	17.00	17.00	17.00	18.00
Gray forge, Pittsburgh	18.01	18.01	18.01	19.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	90.00
Rails, Billets, Etc., Per Gross Ton:				
O.-H. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	32.00	32.00	32.00	33.00
O.-h. billets, Pittsburgh	32.00	32.00	32.00	33.00
O.-h. sheet bars, P'gh	32.00	32.00	33.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	39.00
O.-h. billets, Phila	37.30	37.30	38.30	38.30
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb	1.85	1.85	1.85	1.80
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.80
Steel bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, New York	2.19	2.19	2.19	2.14
Tank plates, Pittsburgh	1.85	1.85	1.85	1.80
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.09
Beams, Pittsburgh	1.85	1.85	1.85	1.80
Beams, Chicago	2.00	2.00	2.00	2.00
Beams, New York	2.14½	2.14½	2.14½	2.04
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire,	July 17, 1928	July 10, 1928	June 19, 1928	July 19, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	*2.60*	2.65	2.65	3.00
Sheets, black, No. 24, Chicago dist. mill	2.75	2.75	2.75	3.10
Sheets, galv., No. 24, Pittsburgh	3.50	3.50	3.50	3.85
Sheets, galv. No. 24, Chicago dist. mill	3.60	3.60	3.60	3.95
Sheets, blue, 9 & 10, Pittsburgh	2.00	2.00	2.00	2.25
Sheets, blue, 9 & 10, Chicago dist. mill	2.10	2.10	2.10	2.35
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh	2.40	2.40	2.50	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.55	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.35	3.25
Barbed wire, galv., Chicago dist. mill	3.25	3.25	3.40	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$14.00	$14.00	$14.50	$15.00
Heavy melting steel, Phila	13.00	13.00	13.50	13.00
Heavy melting steel, Ch'go	12.25	12.25	12.50	12.00
Carwheels, Chicago	12.75	12.75	13.00	13.50
Carwheels, Philadelphia	15.50	15.50	15.50	15.00
No. 1 cast, Pittsburgh	14.25	14.25	14.25	15.00
No. 1 cast, Philadelphia	15.50	15.50	16.00	16.00
No. 1 cast, Ch'go (net ton)	13.50	13.50	14.00	14.50
No. 1 RR. wrot. Phila	13.50	13.50	13.50	15.50
No. 1 RR. wrot. Ch'go (net)	*10.75*	11.00	11.25	11.50
Coke, Connellsville. Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$3.00
Foundry coke, prompt	3.75	3.75	3.75	4.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.75	14.75	14.87½	12.75
Electrolytic copper, refinery	14.50	14.50	14.50	12.50
Zinc, St. Louis	6.20	6.20	6.15	6.17½
Zinc, New York	6.55	6.55	6.50	6.52½
Lead, St. Louis	*6.05*	6.10	6.15	5.95
Lead, New York	6.20	6.20	6.30	6.20
Tin (Straits), New York	*47.25*	46.25	46.62½	63.75
Antimony (Asiatic), N. Y.	*9.50*	9.62½	9.62½	11.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Carnegie Steel Co., Followed by Independents, Announces 2c. for Fourth Quarter Plates, Shapes and Bars

PITTSBURGH, July 17.—Steel producers in this district are taking a stronger position with regard to prices, and the past week has seen a somewhat firmer tone in heavy rolled lines. The quotations of 1.90c., Pittsburgh, for the third quarter, and 2c. for the fourth quarter on bars, plates and shapes give evidence of the apparently growing confidence of makers in the price situation. Further support is indicated by a contemplated increase of $2 a ton to 2.20c. on cold-finished steel bars for fourth quarter shipment. While the three heavy rolled lines still are obtainable for the third quarter at 1.85c., this figure is not so common. The quotation of 1.90c. appears to be an increasing factor in the market and a small amount of business has been taken at this level, though it has not reached a dominating position.

The quotation of 2c. on bars, shapes and plates for the fourth quarter, announced officially Monday by the Carnegie Steel Co. and made effective at once, has been adopted by independent producers and is considered to have given strength to the third quarter quotation of 1.90c. It is not expected that fourth quarter business will be taken this early on the new basis, which represents an increase of $2 a ton over the third quarter quotation.

The activity in the heavy rolled products has undoubtedly given a better tone to the market. These lines, along with such products as tin plate sheets and pipe, played an important part in the unfilled tonnage showing of the United States Steel Corporation. The proposed plan to increase fourth quarter prices on cold-finished steel bars is a reflection of the fair activity in that market, together with the stronger position of the market for hot-rolled bars.

Tin plate and sheet business is good. Sheet mill operations are at the rate of about 75 per cent, while tin mills are engaged at over 90 per cent of capacity. Pipe mills are operating up to 75 per cent or more and showed an increase during the past week of about five points. Large tonnages of oil line pipe recently placed have been an important influence in stimulating production.

Steel works operations also have shown a further increase and now are at the rate of approximately 75 per cent of capacity. From a tonnage viewpoint, the trade is well satisfied with conditions for this season of the year.

The market for pig iron is dull, except for somewhat increased activity in demand for Bessemer tonnages. The market for fuel is extremely dull, and there has been further softening in the market for old material.

The Jones & Laughlin Steel Corporation on Monday blew in an additional furnace and now has 10 of its 12 stacks making iron. The Adrian Iron Co., it is understood, will blow in a stack at Dubois, Pa., on foundry iron on Aug. 1.

So far the hot weather has affected production very little.

Pig Iron.—Moderately increased buying of Bessemer iron has taken place during the past week, but on the other grades inquiry continues extremely dull, and sales have been insufficient to test the strength of prices, so quotations are unchanged. The largest sale of Bessemer iron was 1000 tons, bought by a steel castings producer from a Valley maker at $17, furnace. Another sale of 750 tons of Bessemer iron by a Valley producer also was made. Car lots of foundry have been sold at $16.75, Valley furnace. Basic iron is quoted at $16, Valley furnace, but the market for this grade is so dull that, in the absence of any sizable movement, it is considered nominal at this level. The Westinghouse Electric & Mfg. Co. has not closed on its requirements for its Trafford, Pa., plant. The Jones & Laughlin Steel Corporation on Monday blew in one of the idle furnaces of the Eliza group at the South Side works. This interest is now operating 10 of its 12 blast furnaces. It is reported that the Adrian Iron Co. will blow in a furnace on foundry iron at Dubois, Pa., on Aug. 1.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$16.00
Bessemer	17.00
Gray forge	$16.25 to 16.50
No. 2 foundry	16.75
No. 3 foundry	16.25 to 16.50
Malleable	17.00
Low phos., copper free	26.50

Freight rate to Pittsburgh or Cleveland district, $1.76.

Semi-Finished Steel.—The market for semi-finished steel is only fair, with little third quarter contracting. Prospects for better commitments are in sight, however, particularly because of heavy rolling in such lines as sheets, and somewhat more activity in the market for bars, affecting demand for sheet bars and billets. While some makers continue to quote standard billets and sheet bars at $33, the prevailing level is $32, Pittsburgh, at which the market is firm. This is indicated by the fact that mills are no longer equalizing freight. Owing partially to the recent heavy orders for oil line pipe, the market for skelp is firmer at 1.85c., Pittsburgh or Youngstown. Demand for slabs is quiet, and the market is quoted at $32, Pittsburgh or Youngstown. Wire rods continue to be quoted at $42, Pittsburgh, for third quarter shipment. No price has been named for this product for fourth quarter. Fourth quarter billets are quoted at $33.

Bars, Plates and Shapes.—Third quarter business for bars, plates and shapes still is being taken by some mills at 1.85c., Pittsburgh, and the market is firm at this level. Some prominent makers, however, are quoting 1.90c. for third quarter business, and they are reported to have taken some tonnage at this figure. In all three lines improvement in demand has developed during the past week, with the market manifesting a rising tendency. That producers feel more confident of their position in quoting 1.90c. for third quarter delivery is indicated by the quotation of 2c. they have announced for fourth quarter shipment. The Carnegie Steel Co. yesterday officially announced the price of 2c. on fourth quarter business, effective at once, and independent producers have also adopted this figure, which is an increase of $2 a ton over the quotation of 1.90c. on third quarter business. The small amount of railroad car buying is an unfavorable influence in the market, but taken as a whole activity is good and above the average for this season of the year. Inquiries coming to structural fabricators are numerous, but for the most part are for small lots.

Rails and Track Supplies.—No improvement has developed within the past week in the market for standard or small spikes, for which demand is rather dull. No standard rail requirements have come out during the past week, and it probably will be 30 to 60 days before such tonnages in volume come into the market. The Norfolk & Western Railroad has not closed on its inquiry for 37,000 tons for July-January shipment. A slight improvement exists in the market for light rails, which are quoted at $36, Pittsburgh.

Wire Products.—All makers of wire and wire products are quoting on the basis of the card announced last week by the American Steel & Wire Co., listing prices for third quarter shipment. Wire nails and cement coated nails are quoted at $2.55 per 100-lb., keg, Pittsburgh or Cleveland, with fair specifications for the former, while demand for cement coated nails is quiet. Demand for plain bright, hard fence wire is somewhat better, though not markedly so. Operations of wire mills remain unchanged at approximately 55 per cent of capacity.

Tubular Goods.—Following recent large orders, aggregating perhaps 200,000 tons, active demand for oil line pipe has shown a recession. Some fair-sized inquiries are expected to come into the market soon, however. The large tonnages placed have stimulated production, and operations now are estimated at about 75 per cent or more of capacity. Demand for standard pipe continues good, a fair portion of it coming from the construction industry. The increased price of crude oil has given a better tone to the market, but overproduction still is a serious problem in the oil industry. The Okmulgee Oil & Gas Association, Okmulgee, Okla., has addressed a letter to the Secretary of the Interior at Washington, asking for his opinion as to the possible attitude of the public toward placing a duty on imports of crude oil. This, together with other activities of the oil industry, is interpreted to mean that a section of it, at least, will urge at the next session of Congress an impost on imports of crude oil. Such an effort has been made for the past decade but without success, and it is believed that domestic producers owning fields in Central America and other foreign countries will continue to combat the effort. It is argued that if imports were appreciably reduced, the domestic industry would be considerably stimulated and heavy orders would be placed for pipe.

Sheets.—Specifications for sheets last week were large. The hot weather affected output somewhat and production was on a basis of about 75 per cent of capacity. A large number of specifications call for rush shipments. Increased tonnages are being placed for car material, mostly for repair work. These requirements are largely for galvanized

The Iron Age Composite Prices

Finished Steel

July 17, 1928, 2.319c. a Lb.

One week ago	2.326c.
One month ago	2.341c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

July 17, 1928, $17.09 a Gross Ton

One week ago	$17.09
One month ago	17.23
One year ago	18.50
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.09,	July 10
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c. to 2.00c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.25c. to 2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	1.95c. to 2.00c.
F.o.b. Bethlehem	2.00c. to 2.05c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.01c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.30c.
From 3 in. to 6 in., P'gh	1.85c. to 2.10c.
6 in. and wider, P'gh	*1.75c. to 1.90c.
Narrower than 3 in., Chicago	2.30c.
From 3 to 6 in., Chicago	2.20c.
6 in. and wider, Chicago	2.00c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle	$1.27
2000 bundle lots	1.25
Larger lots	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.15c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, 1 up to 3 tons, P'gh	2.90c. to 3.00c.
Strips, 1 up to 3 tons, Cleveland	2.90c. to 3.00c.
Strips, 1 up to 3 tons, del'd Chicago	3.30c.
Strips, 1 up to 3 tons, Worcester	3.15c. to 3.30c.
Fender stock, Pittsburgh	4.10c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	3.20
Barbed wire, painted	2.95

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.10c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.65c. to 2.75c.
No. 24, f.o.b. Chicago dist. mill	2.75c.
No. 24, del'd Cleveland	2.79c. to 2.89c.
No. 24, del'd Philadelphia	2.97c. to 3.07c.
No. 24, f.o.b. Birmingham	2.95c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c.
No. 24, del'd Cleveland	3.54c. to 3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.85c. to 2.90c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill)
Alloy Quality Bar Base, 2.65c.

S.A.E. Series Numbers		Alloy Differential	Net Price 100 Lb. Bars
2000	(½% Nickel)	$0.25	$2.90
2100	(1½% Nickel)	0.55	3.20
2300	(3½% Nickel)	1.50	4.15
2500	(5% Nickel)	2.25	4.90
3100	Nickel Chromium	0.55	3.20
3200	Nickel Chromium	1.35	4.00
3300	Nickel Chromium	3.80	6.45
3400	Nickel Chromium	3.20	5.85
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.15
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.35
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.70
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.00
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.10
5100	Chromium Spring Steel	0.20	2.85
6100	Chromium Vanadium Bars	1.20	3.85
6100	Chromium Vanadium Spring Steel	0.95	3.60
9250	Silicon Manganese Spring Steel	0.25	2.90
	Chromium Nickel Vanadium	1.50	4.15
	Carbon Vanadium	0.95	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 Lb.
Spikes, ⅜ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47⅞	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2¼ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel		Charcoal Iron
Under 5000 lb.	4 Fives	1 Ten
5000 lb. to 12,000 lb.	5 Fives	2 Tens
12,000 lb. to 21,000 lb.	6 Fives	2 Tens & 2½
21,000 lb. and over	7 Fives	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	45
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ and 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

sheets for roofing and for refrigerating cars, and also blue annealed sheets for freight cars generally. Demand, however, comes from numerous sources. More activity has been shown by jobbers, although they are not contracting freely. Prices are firm, with blue annealed quoted at 2c., galvanized at 3.50c., and black at 2.65c., Pittsburgh.

Ferroalloys.—Inquiry for ferromanganese is light. Many consumers are covered for the last half. The market is unchanged at $105, Atlantic seaboard, for both domestic and foreign material. Consumers of 50 per cent ferrosilicon are supplied for the last half, and the market for this product is dull. Specifications for speigeleisen are small. Quotations range from $31 to $32, furnace.

Tin Plate.—While hot weather during the past week slowed down production of tin mills in this district, the loss in output was comparatively small. Mills are receiving heavy specifications, but despite large commitments some producers are a little ahead on obligations and have even been able to fill some requirements which call for August delivery. The American Sheet & Tin Plate Co. operated 96 per cent of its tin mills last week, and probably will maintain that rate during the current week. Some independents also are producing at or near that rate.

Cold-Finished Steel.—Demand for cold-finished steel bars is regular and fair, and production is at the rate of 65 to 70 per cent. Automobile makers continue a prominent factor in the market, the tone of which is stronger at 2.10c. per lb., Pittsburgh. It has been given stimulus partially by the stronger position of merchant steel bars. Some makers of cold-finished bars are contemplating an increase of $2 a ton for fourth quarter delivery, which would be in line with the policy adopted regarding soft steel bars.

Hot-Rolled Flats.—Recent slackening in demand for hot-rolled strips was followed during the past week by heavy requirements, and the tone of the market generally has improved. While there has been a slight let-up in demand from the automotive industry, it continues fair. Whatever falling off there has been in that quarter has been offset by placements by other industries. The price situation is steadier, although some buyers still show resistance to current quotations.

Cold-Rolled Strips.—Demand for this line has improved and it is somewhat more active than that for hot-rolled flats. Operations generally are rated at about 70 per cent of capacity, which is heavier than they were in the corresponding period a year ago. The leading source of specifications is the automotive industry, but they also come from miscellaneous lines.

Bolts, Nuts and Rivets.—The market for bolts, nuts and rivets is fair. The automotive industry is buying in moderate volume, although demand from this source has tapered off somewhat. Prices are unchanged, and operations are at the rate of about 60 per cent of capacity.

Coal and Coke.—Extreme dullness prevails in the market for fuel. Small lots of Lake cargo coal are moving, but the market shows no improvement. Consumers in this district appear to have ample stocks on hand and are showing practically no interest in the market. Prices are unchanged. Only light tonnages of beehive coke are being bought, and inquiry for both the furnace and foundry grades is unusually limited. There is slightly more activity in the latter than in the former. Virtually no contracting has developed as yet. Prices vary, depending on the quality, but on spot shipments the levels of $2.60 on furnace coke, and $3.75 on foundry fuel at Connellsville ovens continue to be representative of the market.

Old Material.—Further softening has developed in the market for scrap. Heavy melting steel is down 25c. a ton; heavy breakable cast for the basic open-hearth furnace and low phosphorus punchings for the electric furnace have declined 50c. a ton, while a drop of 25c. has taken place on railroad knuckles and couplers, railroad coil and leaf springs, and rolled steel wheels for the acid open-hearth furnace. Recent sales have established $14 as the maximum price on heavy melting steel. The Pennsylvania Railroad list, which closed last week, brought out prices as high as $14.75, Steubenville, Ohio, and 10c. or 15c. less at Midland, Pa., on this grade, but, as is often the case, such tonnages commanded premium prices. Some of the material was taken by dealers to cover on contracts. Consumers generally are well supplied with scrap and are reported still to have sufficient stocks on hand to keep them out of the market for 30 days or more. Supplies in the hands of dealers, for the most part, appear to be small, and caution is being shown by them in taking additional tonnages except as immediate requirements demand.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.55c.
Galv. sheets (No. 24), 25 or more bundles	4.40c.
Blue ann'l'd sheets (No. 10), 25 or more sheets	3.10c.
Galv. corrug. sheets (No. 28), per square	$4.31
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel	$13.75 to $14.00
Scrap rails	13.25 to 13.50
Compressed sheet steel	13.50 to 14.00
Bundled sheets, sides and ends	12.50 to 13.00
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	14.00 to 14.50
Heavy breakable cast	11.00 to 11.50
No. 2 railroad wrought	13.75 to 14.00
Heavy steel axle turnings	12.00 to 12.50
Machine shop turnings	9.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	14.75 to 15.25
Railr. coil and leaf springs	14.75 to 15.25
Rolled steel wheels	14.75 to 15.25
Low phos. billet and bloom ends	19.00 to 19.50
Low phos., mill plate	17.50 to 18.00
Low phos., light grade	16.50 to 17.00
Low phos. sheet bar crops	17.50 to 18.00
Hvy. steel axle turnings	12.50 to 13.00
Electric Furnace Grades:	
Low phos. punchings	16.00 to 16.50
Hvy. steel axle turnings	12.50 to 13.00
Blast Furnace Grades:	
Short shov'l'g steel turnings	9.50
Short mixed borings and turnings	9.50
Cast iron borings	10.00
No. 2 busheling	8.50 to 9.00
Rolling Mill Grades:	
Steel car axles	18.00 to 18.50
No. 1 railroad wrought	10.50 to 11.00
Sheet bar crops	16.00 to 16.50
Cupola Grades:	
No. 1 cast	14.25 to 14.50
Rails 3 ft. and under	15.00 to 15.50
Malleable Grades:	
Railroad	13.75 to 14.00
Industrial	13.25 to 13.50
Agricultural	12.75 to 13.00

Carnegie to Build New Pittsburgh Warehouse

The Carnegie Steel Co. has filed plans for a new warehouse on Lighthill Street, Pittsburgh, to cost $296,000, with equipment. The new warehouse is to replace the old one on Eleventh Street, which was taken over by the Pennsylvania Railroad in connection with its plans for a new freight yard in that section.

Mexico, said to be second to China as a producer of antimony, mined much less of that mineral last year, according to reports from American consuls at Mexico City, San Luis Potosi and Nogales, made public by the Department of Commerce. Official figures placed Mexico's antimony output in 1927 at 1894 tons, compared with 2573 tons the preceding year, which was a record year.

The blast furnace of the Temple Iron Co. at Reading Pa., has been sold at a public sale by Paul Brooks, receiver, for $52,266 to Abraham Sofransky, Allentown, Pa., and Israel Liever, Reading, Pa., dealers in scrap iron and metal. The unit will be dismantled at once.

The Eastern Scrap Iron Association has appointed Benjamin Schwartz, a lawyer of Baltimore and Philadelphia, as director-general of its activities.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$32.00 to $33.00
Rerolling, under 4-in. to and including 1¾-in.	33.00 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$32.00 to $33.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$32.00 to $33.00
Smaller than 8 in. x 2 in.	33.00 to 34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00
Screw stock	$5.00 per ton over base

*Chicago mill base is $43. Cleveland mill base, $42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.00 to $11.25
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey city, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.05
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.15

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$17.00
No. 2 lump, Illinois and Kentucky mines	$18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut threads	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Backlogs Diminishing Though Current Bookings Are Large—Ingot Output Expected to Decline

CHICAGO, July 17.—Bookings in finished steel are larger than at this season a year ago, but backlogs are diminishing, especially in the heavier rolled products. While steel ingot output is unchanged at 75 to 80 per cent of capacity, present indications point to a decline of 10 points or more before the middle of next month. Specifications from the farm equipment and automotive industries, as well as from miscellaneous manufacturing lines, are well maintained, but heavy-tonnage orders for oil storage tanks and railroad cars are lacking. Fabricating awards are also light, although a large amount of structural work is still pending. Some of the larger building projects, however, are slow in maturing, being held back by delays in financing.

Business now being booked is mainly in lighter products, which, although they keep the mills busy, take proportionately smaller quantities of raw steel. There is a dearth of the kind of specifications that make for economical operations.

Rail orders placed by the Northern Pacific and the Great Northern added a total of 21,000 tons to the bookings of local mills. This is not sufficient, however, to have much effect on rail production in this district. One rail mill has virtually completed deliveries against its contracts, the other may be able to continue through this month at a 60 per cent rate.

In comparison with bookings in the first week of the month, which was characterized by the dullness that usually follows the completion of a quarter, business in the past week was good. Total sales were 50 per cent greater and specifications 100 per cent greater than in the previous week. There has been a fair volume of third quarter contracting, considerably more than at this season in 1927, but buyers are not obligating themselves for more steel than they expect to use.

Business in bars is much more active than in structural shapes or plates. Demand for sheets in this district continues to drag. In the absence of severe tests, mill prices appear to be holding. As low as 1.95c., Chicago, has been done on attractive tonnages of sheared plates, and 3.50c., Chicago mill, has been named on galvanized sheets, but such concessions are exceptional. In fact, local mills are apparently more determined than ever to hold prices at a stable level.

As announced in THE IRON AGE market summary a week ago, the Chicago subsidiary of the Steel Corporation is quoting 2.10c., Chicago, on bars, plates and shapes for fourth quarter shipment, or an advance of $2 a ton over the current market. Thus far, however, little interest in fourth quarter requirements has been shown.

Another evidence of efforts by mills to stiffen the market is an announcement that no specifications against third quarter contracts will be accepted after Sept. 15. Of late, laxity in accepting specifications has permitted consumers to get the benefit of a given price well into the succeeding quarter.

Pig Iron.—The reduction last week of 50c. a ton on foundry and malleable grades to $17.50, base, local furnace—the lowest price since November, 1915—has brought no unusual amount of buying. Many melters are covered through this quarter and others are in no hurry to buy. The attitude of buyers is no doubt explained by seasonal dullness, which is beginning to make itself felt in some directions. On the other hand, automobile companies that have brought out new models are placing larger orders for castings. Large inquiries for pig iron are lacking and there have been only a few sizable sales. Several lots of 500 to 1000 tons of foundry iron have been placed in Chicago, and a northern Illinois melter closed for 1000 tons of foundry for the remainder of the year. Opinion is divided on whether the recent reduction in Chicago pig iron will keep out shipments of iron by boat. It is agreed that little foundry iron in the base grade can be shipped in by water at the present market, but it is said that iron in higher silicon analysis may still succeed in penetrating this district. It is a matter of comment that local prices are now lower than delivered prices in Cleveland and are on a parity with the ruling furnace price at Detroit.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.00
Malleable, not over 2.25 sil	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	21.51
So'th'n No. 2 (barge and rail)	21.01
Low phos., sil. 1 to 2, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15%	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—The market is inactive. Spiegeleisen remains at $32, furnace, on contracts and at $33, furnace, on spot business. Some interest is manifested in the possibility of shipping ferromanganese by ocean vessel from England to Chicago at a rate of $5.60 per ton. If sellers should insist on a price of $105, seaboard, there would be no advantage in shipping the material by this route.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $40.76.

Plates.—Both sales and specifications showed a recovery following a lull in bookings during the first week of the current quarter. Sales for the week were nearly twice as large as in the previous seven-day period. Mills are still able to operate at 80 per cent of capacity, but backlogs are diminishing and there is little heavy-tonnage business pending. No new oil storage tank work has appeared and little railroad car business is developing. Meanwhile railroad car builders are fast completing contracts in hand. A report that the Pennsylvania Railroad will enter the market for several thousand freight cars lacks verification. Current orders are mainly from miscellaneous manufacturers and structural fabricators. Prices are unchanged in the absence of a real test.

Mill prices on plates, per lb.: 2c., base Chicago.

Structural Material.—Fabricating awards are light and competition for pending business is keen. While there are several very large local projects in prospect, notably the Apparel Mart, 60,000 tons, and the Agricultural Mart, 80,000 tons, they are slow in maturing. Early action is expected on 2500 tons for a pipe shop to be built for the A. O. Smith Corporation, Milwaukee. The ruling price on plain material remains at 2c., Chicago.

Mill prices on plain material, per lb.: 2c., base, Chicago.

Sheets.—Demand is light except from the automotive industry, which gets relatively little sheet tonnage from Chicago district mills. Sheet producers in this area are finding it difficult to maintain a 60 per cent rate of operations. Prices are holding as a rule, although in the Northwest as low as 3.50c., mill, a concession of $2 a ton, has been done on galvanized in a few instances.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c.; No. 24 galv., 3.65c.; No. 10 blue ann'l'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chgo. deliv'd prices.

Bars.—Demand for bars is considerably heavier than a year ago. Shipments of mild steel bars to the automobile industry are in undiminished volume. The Nash Motors Co. has 30,000 cars on order and is trying to reach a maximum production rate, with a scheduled monthly output of 20,000 cars for July, August and September. The plants of the Studebaker Corporation, the Chrysler Corporation and the Willys-Overland Co. are reported to be operating at capacity. The Willys-Overland Co. is said to have sold more cars in the first six months of 1928 than in all of last year. Farm equipment manufacturers, optimistic on account of favorable crop prospects, are through with inventory-taking and are getting production up to capacity as rapidly as possible. They are reported to be enjoying the best business in ten years. Third-quarter contracting is in larger volume than a year ago, although buyers are obligating themselves only for known requirements. The leading interest has announced that it will accept no third-quarter specifications after Sept. 15. Demand

for alloy steel bars continues at a high rate, reflecting the activity of automobile plants that buy from Chicago mills. Seasonal dullness prevails in rail steel bars, although mill backlogs are large enough to insure double turn operations through July and well into August. Bed makers are expected to buy more actively with the conclusion of the furniture show. Specifications fall slightly short of shipments, but a reduction in output is being avoided by accumulating stocks of reinforcing bars and fence post steel. Rail steel bar prices are steady at 1.85c., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Wire Products.—The recent general reduction in mill quotations failed to stimulate buying to any great extent. There has been some third-quarter contracting, but an increasing number of jobbers and consumers are showing a preference for open market buying. Manufacturers' wire is more active than common products. The sustained activity of the automotive industry has been reflected in a large consumption of wire. The market in common products is expected to remain quiet until mid-August, and the sales force of a leading wire products manufacturer is now on vacation. Shipping orders are sufficient to support mill operations at 65 per cent of capacity. For mill prices see page 175.

Cold-Rolled Strip.—Mill prices have now settled to a single price of 3c. per lb., Cleveland, for lots of 1 ton up to 3 tons, or 3.30c., Chicago. Specifications are still in good volume from the automotive trade. An estimate that the State of Michigan alone uses 250,000 tons of cold-rolled strip a year, or nearly 42 per cent of the entire country's consumption of 600,000 tons, indicates the importance of the automobile industry as a strip mill customer.

Warehouse Business.—Local warehouse prices are unchanged. Jobbers find the volume of trade about on a par with that of July, 1927.

Rails and Track Supplies.—The Northern Pacific has placed 15,000 tons of rails with the Illinois Steel Co. and 10,000 tons with the Bethlehem Steel Co. The Great Northern has bought 8000 tons, of which 4000 tons was placed with the Illinois Steel Co. and 2000 tons each went to the Inland and Bethlehem companies. The Great Northern wants early delivery on this tonnage and is expected to come in the market for additional requirements totaling close to 20,000 tons. Early shipment is also wanted on part of the Northern Pacific tonnage. This business, together with good-sized releases of contract tonnage, will keep one of the local rail mills going for the rest of the month at a 60 per cent rate. The other rail mill, however, has virtually reached the end of its backlog. Orders for tie plates, angle bars, spikes and bolts distributed by the Great Northern with the rail purchases total 2000 tons. The Northern Pacific, however, bought only 500 tons of track supplies, representing requirements for 2000 tons of rails on which prompt shipment was asked. In addition to these orders, about 2500 tons of track fastenings on contract was released for rolling. Production of tie plates is at 100 per cent of capacity at a leading plant, while the operating rate averages 40 per cent for bolts and ranges from 60 and 70 per cent for spikes and angle bars.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—Outside of a fair run of small orders from contractors, new business is light. Prices, however, are stronger, ranging from $32 to $35, Birmingham, for 6-in. and larger diameters. In fact, several companies are quoting a minimum of $35 on all business, while others are asking that price on lots of less than 200 tons. Milwaukee will close July 18 on 750 tons of 6-in., 950 tons of 8-in., 75 tons of 12-in. and 225 tons of 16-in. Class C. St. Clair Shores, Mich., will take bids July 24 on 45,000 ft. of 6-in. and 60,000 ft. of 8-in.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in., and over, $40.20 to $43.20; 4-in., $44.20 to $47.20; Class A and gas pipe, $4 extra.

Reinforcing Bars.—This market shows greater activity in awards, though individual lettings usually run less than 300 tons each. The pending list is still of such size that it holds out fair promise to dealers. Fresh projects are scarce but estimators are busy and it is not unlikely that the next three or four weeks will find prices being asked on a number of new tonnages. The Chicago Rapid Transit Co. is elevating its track in North Evanston, Ill., and will require reinforcing bars for retaining walls. Opinions as to trends in prices are varied and it may be said that the market lacks the strength displayed two weeks ago. New contracts and fresh inquiries are given on page 190.

Cold-Finished Bars.—Current business is about on a par with that of a year ago. Some seasonal recession in specifications from the automobile industry, as well as from other lines, has developed.

Bolts, Nuts and Rivets.—Specifications are again coming in large volume from the farm equipment industry, although in previous years production of implements and tractors was rarely resumed on a broad scale before the middle of August. Business from the automotive industry also remains good. Bolt and nut plants are operating at a 65 per cent rate.

Old Material.—The market has a weak tone, but trade is so inactive that prices have undergone little change. The supply of scrap is large, and consumption is declining. Buyers are looking for still lower prices and expect to get them. The melt of steel foundries is lower, and there has been a marked decrease in activity among malleable plants. Meanwhile mill output is rather well maintained, although a more pronounced seasonal decline is expected to develop in August. Railroad lists include: Chicago & Alton, 1500 tons; Chicago, Milwaukee, St. Paul & Pacific, 200 tons; Chesapeake & Ohio, 17,500 tons.

Prices deliv'd consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.25 to $12.75
Shoveling steel	12.25 to 12.75
Frogs, switches and guards, cut apart, and misc. rails	13.50 to 14.00
Hydraul. compressed sheets	11.00 to 11.50
Drop forge flashings	9.50 to 10.00
Forg'd, cast and r'l'd steel carwheels	15.25 to 15.75
Railr'd tires, charg. box size	15.50 to 16.00
Railr'd leaf springs, cut apart	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.75 to 14.25
Coil springs	15.75 to 16.25
Electric Furnace Grades:	
Axle turnings	12.50 to 13.00
Low phos. punchings	14.00 to 14.50
Low phos. plate, 12 in. and under	14.00 to 14.50
Blast Furnace Grades:	
Axle turnings	9.50 to 10.00
Cast iron borings	9.00 to 9.50
Short shoveling turnings	9.00 to 9.50
Machine shop turnings	6.00 to 6.50
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	14.75 to 15.25
Cupola Grades:	
Steel rails less than 3 ft.	15.25 to 15.75
Angle bars, steel	14.25 to 14.75
Cast iron carwheels	12.75 to 13.00
Malleable Grades:	
Railroad	12.50 to 13.00
Agricultural	11.50 to 12.00
Miscellaneous:	
*Relay'g rails, 56 to 60 lb.	23.00 to 25.00
*Relay'g rails, 65 lb. and heav.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	13.50 to 14.00
Iron arch bars and transoms	19.50 to 20.00
Iron car axles	23.50 to 24.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	10.75 to 11.25
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.50 to 10.00
No. 2 busheling	5.75 to 6.25
Locomotive tires, smooth	12.00 to 12.50
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	12.75 to 13.25
No. 1 agricultural cast	12.50 to 13.00
Stove plate	10.75 to 11.25
Grate bars	11.25 to 11.75
Brake shoes	10.00 to 10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.30c. to 3.00c.
Reinforc'g bars, hard steel	2.00c. to 2.70c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.65c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, stand. railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60

No. 8 black ann'l'd wire, per 100 lb.	$3.30
Com. wire nails, base per keg	3.10
Cement c't'd nails, base per keg	3.10

Philadelphia

Steel Buying Shows Further Gains in July's Second Week —Scrap Market Weaker

PHILADELPHIA, July 17.—Steel business, having shown unusual summer vitality in the first week or ten days of July, has made further gains in the last week. If the orders of the latter half of the month equal those of the first half, the month may be the best July in several years. Everything ordered is wanted in a hurry; mills which are unable to ship within a week are frequently unable to secure the order. A more liberal volume of orders from the Pennsylvania Railroad has helped the situation materially. Structural steel is one of the most active lines. New projects are not numerous, but fabricating shops have nearly full schedules and are drawing on the mills for a fairly large tonnage. The average operation of all Eastern mills is probably not less than 75 per cent. The Bethlehem Steel Co. averages 80 per cent in all departments. Other mills rolling shapes are running from 70 to 80 per cent, while plate mill operations range from 50 to 65 per cent. Steel prices are holding fairly steady. Foundry pig iron remains at the $19.50 base, to which it declined a week or so ago. Scrap shows further weakness.

Pig Iron.—Foundry pig iron, which declined a week or so ago to $19.50, base, at eastern Pennsylvania furnaces, is holding at that level, with some single carload sales at $20. Business has been unimportant as to volume. A 400-ton inquiry for foundry iron brought sharp competition between eastern Pennsylvania and New York State furnaces, and the business is reported to have been placed with a New York maker at slightly under the quotations of furnaces in this district. Copper free low phosphorus iron is quoted by a nearby furnace at $24, furnace, and copper bearing iron is available at $23, furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$20.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76
East. Pa. No. 1X	21.26
Basic (del'd east. Pa.)	$19.00 to 19.50
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Ferromanganese. — Most of the larger users of ferromanganese are still getting shipments against $100 first half contracts, or have sufficient stock piles to cover nearby requirements. Some of the smaller users have made second half contracts at $105, seaboard, but the bulk of the second half contracting probably will not be done before August.

Billets.—Quotations on rerolling billets range from $32 to $33, Pittsburgh, with the higher figure generally used on high carbon grades. Forging billets remain at $38, Pittsburgh.

Plates.—A steady flow of small, hurry-up orders for plates is keeping operations at Eastern mills on an even keel. One mill is operating at about 65 per cent, while others are at 50 to 60 per cent. On nearly all sales 2c., Coatesville, applies.

Structural Shapes.—Not many new structural steel projects have come out for bids in the last week, but fabricators are extremely busy with work on their books and some are bidding only on those jobs which will fit in with their delivery promises. A number of shops can take small jobs to fill in, but cannot accommodate large jobs to their shop schedules if early deliveries are required. Prices of plain material have weakened again, sales having been made to some of the larger fabricators at 2.01c., Philadelphia, though most of the transactions are at 2.06c., Philadelphia. This is peculiarly a local condition, but even at some points where Pittsburgh freight rates are the governing factor Eastern mills are unable to obtain more than 1.75c., Pittsburgh, on competitive business.

Bars.—Some mills have extended second quarter contracts at 1.85c., Pittsburgh, so that consumers' requirements for all of third quarter will be provided for at this price; other mills, however, are insisting that all 1.85c. tonnage shall be specified by Sept. 10. The groundwork is being prepared for an advance to be effective on all fourth quarter business.

Sheets. — Makers of sheets are standing somewhat more firmly for present prices, with the result that quotations are more nearly uniform than in some time. On galvanized sheets, 3.50c., Pittsburgh, to consumers and 3.40c. to jobbers are the usual quotations. Black sheets are at 2.65c., with occasional transactions at 2.60c., while blue annealed sheets remain at 2c., with some mills getting $1 or $2 a ton higher for small lots in widths greater than 40 in.

Imports. — Last week's receipts from abroad included 9710 tons of Algerian iron ore, 996 tons of pig iron from India, 100 tons of steel scrap from Germany, 50 tons of ferromanganese from England, 30 tons of steel bands from England, 69 tons of steel bars and 201 tons of structural shapes from Belgium.

Old Material.—Prices for various grades of scrap have gone so low that scrap dealers and brokers are expecting a rebound, but the demand from consumers which would make such a recovery possible fails to develop. Meanwhile, the amount of scrap that must be shipped seems sufficient to take care of all demands, and buyers have pushed prices still further downward in the past week, although the changes are slight. A nearby steel mill has been sounding out the market for heavy melting steel, and it is reported, is willing to pay $12.50, delivered at its plant, but dealers and brokers are holding for $13.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.00
Scrap T rails	12.50
No. 2 heavy melting steel	10.50 to 11.00
No. 1 railroad wrought	13.50 to 14.50
Bundled sheets (for steel works)	9.50 to 10.00
Machine shop turnings (for steel works)	10.00 to 10.25
Heavy axle turnings (or equiv.)	12.00 to 13.00
Cast borings (for steel works and roll. mill)	10.00 to 10.50
Heavy breakable cast (for steel works)	14.00 to 15.00
Railroad grate bars	11.00 to 11.50
Stove plate (for steel works)	10.50 to 11.00
No. 1 low phos., hvy., 0.04% and under	17.50 to 18.00
Couplers and knuckles	14.50 to 15.00
Rolled steel wheels	14.50 to 15.00
No. 1 blast f'nace scrap	9.50 to 10.00
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	16.50 to 17.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00
Cast iron carwheels	15.50
No. 1 cast	15.50 to 16.00
Cast borings (for chem. plant)	14.50 to 15.00
Steel rails for rolling	14.50 to 15.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, ⅜-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.50c. to 3.00c.
Cold-fin. steel, rounds and hex.	3.35c.
Cold-fin. steel, sq. and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 to ⅜-in., inclus.	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Navy Wants 1950 Tons of Plates and Bars

WASHINGTON, July 17.—The Bureau of Supplies and Accounts, Navy Department, will open bids on July 24 for approximately 1300 tons of plates and 650 tons of steel bars for delivery at various navy yards.

The Colonial Steel Co., Pittsburgh, has opened its new St. Louis warehouse at 712-14 Cass Avenue. High-speed, carbon tool and hollow and solid drill steels are carried in stock, and Charles V. Franklyn is district manager.

New York

Pig Iron Sales Total About 12,000 Tons—15,000 Tons of Steel Needed for Additional Subway Work

NEW YORK, July 17.—With sales of about 12,000 tons during the past week, the pig iron market has shown more activity than has been in evidence for more than a month. This is due partly to increased foundry operations in western Connecticut and New Jersey and may also be attributed partly to the fact that consumers have been hesitant in making third quarter commitments. Recent buying however, has been largely for spot shipment to cover melters' immediate operating needs and does not indicate any desire on the part of consumers to take advantage of the present low price levels to anticipate future requirements. New inquiry is not in large volume and includes 1000 tons for the Pennsylvania Railroad and several lots of 100 to 300 tons. An inquiry for 2000 tons of ballast iron for delivery on the Pacific Coast has not been acted upon, and a New York district melter is still in the market for 1000 tons. The Crane Co., Bridgeport, Conn., has closed on its recent inquiry for 1200 tons of foundry iron, the order having been divided between a Buffalo furnace and the Massachusetts maker. The Worthington Pump & Machinery Corporation has also bought an additional 550 tons for Harrison, N. J., the order having been divided between a Buffalo furnace and an eastern Pennsylvania interest. Two merchant stacks in the Buffalo district have been blown out during the last three weeks and another is expected to follow the last of the month. However, following a reduction in freight rates effective Aug. 4, the Perry furnace at Erie, Pa., will be able to compete in the New York district on an equal basis with the Buffalo producers. Apparently in an effort to compete with the barge and rail rate from Buffalo to eastern Pennsylvania cities, the Delaware, Lackawanna & Western Railroad has reduced the freight rate between Buffalo district points and Philadelphia from $4.91 a ton to $4.66. The reduction applies only until Sept. 1. Prices have not changed materially in the last week, with Buffalo foundry iron ranging from $16 to $17, base furnace. In New England an instance of the waiving of the silicon differential is reported. Eastern Pennsylvania producers are quoting $19.50, furnace, and one large interest is quoting $19.51 to $20.01, eastern New Jersey tidewater, to meet prices of Buffalo and New York State furnaces.

Prices per gross ton, deliv'd New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.39 to 22.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.89 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Bars, Shapes and Plates.—Interest in the heavier products continues to center upon the efforts of mills to establish third quarter prices at 1.90c., Pittsburgh, for bars, 2.05c., Coatesville, Pa., for plates, and 2.05c., Bethlehem, Pa., for shapes. It now seems apparent, however, that too many contracts have already been made, allowing customers the advantage of prices current during the quarter just passed, to enable mills to get the $1 a ton advance to any extent during July, August and September. On spot business the new prices seem to be regularly adhered to, but contracts at the higher levels, particularly on plates and shapes, are the exception rather than the rule. But mills find encouragement in the statement of the Steel Corporation that fourth quarter prices will be on a basis of 2c., Pittsburgh, and also in the action of a number of producers in naming Sept. 10 as the last day on which specifications on present contracts will be accepted. This practice coincides with the policy already followed by some makers in which contract periods are based upon shipments rather than specifications. This plan would prevent consumers from obtaining materials on old contracts for a month or more after the beginning of a new quarter and enable mills to begin a three-month period without a large tonnage of old orders at conflicting prices on their books. Encouragement is also found in the well sustained tonnage which has been specified during the last two weeks, and the month's aggregate promises to be very satisfactory. An office building let during the week in New York will take 13,000 tons of shapes, and 15,000 tons will be required for two sections of the subways, on which bids will close July 27. Eastern car builders have taken orders for more than 2000 freight cars for two South American roads, but the only outstanding domestic inquiry, that of the Seaboard Air Line for 1000 box cars, has not yet been acted upon.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; struct. shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Sheets and Strips.—Business continues in fair volume and the firmer tendency in prices, which has been manifested during the last two weeks, has given the market a more optimistic outlook. On galvanized sheets, only the large jobbers are being given the benefit of the 3.40c. Pittsburgh price, with the general run of business being taken at 3.50c. Black sheets range from 2.60c. to 2.70c., with 2.65c. the ruling price. A 2c. minimum is being maintained on the blue annealed product. There is not enough demand for strip steel to bring out price irregularity and what business there is to be placed is taken without difficulty at the established levels.

Cast Iron Pipe.—In spite of recent price advances by Southern makers, bids submitted last week on a large tonnage at Washington indicate a somewhat weaker tone in the Eastern market. On 3000 tons of 8, 12 and 16-in. class B pipe and some fittings, R. D. Wood & Co. were low with a bid of $34.67 for pipe and $72.24 for fittings. Other bids ranged from $37 for pipe and $93.50 for fittings to $41 and $110 respectively. The Warren Foundry & Pipe Co., with a bid of

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.60c. to 3.80c.
No. 22	3.75c. to 3.95c.
No. 24	3.80c. to 4.00c.
No. 26	3.90c. to 4.10c.
No. 28*	4.05c. to 4.25c.
No. 30	4.30c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

$38.40, was low on 300 tons of 3 to 12-in. class B pipe for Newark, N. J. Taking into consideration the considerable tonnage of small-dimension pipe included in the job, this bid is well within the range of $37.60 to $38.60, delivered New York, which is being generally quoted by Northern foundries. Southern makers continue to quote $34 to $35, base Birmingham, on the general run of business, equivalent to $43.25 to $44.25, delivered New York.

Prices per net ton, deliv'd New York: Water pipe 6-in. and larger, $37.60 to $38.60; 4-in. and 5-in., $42.60 to $43.60; 3-in., $52.60 to $53.60; Class A and gas pipe, $4 to $5 extra.

Old Material.—The scrap market is weak and inactive, with buyers' prices of heavy melting yard steel and stove plate off 25c. per ton. Other grades are unchanged but lack strength. Dealers in this district are showing considerable interest in the appointment of a director general for the East Scrap Iron Association, which was accomplished at a recent meeting in New York, with a view toward improving conditions in the industry.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$9.50 to	$9.85
Heavy melting steel (yard)	6.00 to	6.25
No. 1 hvy. breakable cast	10.50 to	11.00
Stove plate (steel works)	6.75 to	7.25
Locomotive grate bars	7.00 to	7.50
Machine shop turnings	6.00 to	6.50
Short shoveling turnings	6.00 to	6.50
Cast borings (blast furn. or steel works)	6.00 to	6.50
Mixed borings and turnings	6.00 to	6.50
Steel car axles	13.50 to	14.00
Iron car axles	23.50 to	24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.25 to	8.75
Forge fire	6.50 to	6.75
No. 1 railroad wrought	9.50 to	10.00
No. 1 yard wrot., long	8.00 to	8.50
Rails for rolling	10.00 to	10.50
Cast iron carwheels	11.00 to	11.50
Stove plate (foundry)	8.50 to	9.00
Malleable cast (railroad)		10.00
Cast borings (chemical)	10.75 to	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machy. cast	$14.00 to	$15.00
No. 1 hvy. cast (columns bldg. materials, etc.), cupola size	12.00 to	13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to	12.50

Reinforcing Bars.—More than 1700 tons of bars will be required for a railroad bridge at Providence, R. I., on which the Merritt-Chapman & Scott Corporation, New York, is general contractor. Lettings during the last few days have included scarcely any large tonnages and the volume of small orders has been low. Distributers generally are quoting 1.90c., Pittsburgh mill, but on large jobs, on which lump sum bids are submitted, concessions usually appear. The Youngstown warehouse price is unchanged at 2.20c. per lb., or 2.57½c. on cars at New York, and out of New York warehouse the common quotations are 2.80c. for lots of 5 tons or more, 2.95c., for lots of 2 to 5 tons and 3.24c. for less than 2 tons, all delivered at job.

Warehouse Business.—Thus far in the month, business has generally been equal to, and in some cases has exceeded, that placed during the corresponding June period. Prices are unchanged in all lines, and sheets, which have been the weakest item for some time, seem to be reflecting the somewhat firmer tone in mill prices.

Coke. — Most consumers who buy foundry coke over six-month or yearly periods have closed their contracts and spot buying is negligible. The price of foundry coke is unchanged at $3.50, Connellsville, with the furnace grade quoted at $2.50 to $2.75. There is a fair demand for special brands of foundry coke, quoted at $4.85 f.o.b. ovens. Delivered prices on this product are: To northern New Jersey, Jersey City and Newark, $8.56 per net ton; to New York and Brooklyn, $9.44. By-product foundry coke is unchanged at $9 to $9.40 per net ton, Newark or Jersey City, and $10.06 to $10.29, New York or Brooklyn.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.75c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb	$2.85
No. 9 gal. wire, per 100 lb	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

Cleveland

July Steel Demand Holding Up Well—Some Automobile Plants Slowing Down Production

CLEVELAND, July 17.—The volume of business in finished steel is holding up well for July and the demand for some lines is better than for the same month last year. Specifications with some producers during the first half of July showed a slight gain over those of June. Orders from the automotive industry are holding up well on some products; for alloy steel particularly they show quite an increase over last month.

Some of the automobile manufacturers are slowing down production this month and by Aug. 1 they will be operating at considerably reduced schedules, compared with the peak of the spring season. Others that have brought out new models are still keeping up good production, but whether this will be maintained long depends on the extent to which the new models stimulate sales. Reports indicate a falling off in retail sales of cars, and there is some expectation that with the surprisingly large volume of business in the first half of the year there will be quite a curtailment in the demand for automobiles in the latter part of the year. Stamping plants and forge shops in this territory are still well filled with automobile work.

Sales during the week helped to clarify the price situation on steel bars, plates and structural material. While 1.90c., Pittsburgh, is still the asking price of several mills, most of the larger consumers are able to place orders at 1.85c., and the higher price is generally limited to small-lot buyers. Cleveland mills quote steel bars at 1.85c., mill.

A lull has developed in the building field, and there is no new structural inquiry for lots of any size.

Pig Iron.—Sales increased in the past week, during which Cleveland interests closed contracts for 32,000 tons of foundry and malleable iron either for early shipment or the third quarter. Shipments continue fairly heavy and show a gain over those of June, when there was some slowing down for the July 1 inventories. The automotive industry is taking about as much iron as in earlier months of the year, although a large part of that being shipped to automobile foundries this month has been carried over from second quarter contracts. Many consumers are following a hand-to-mouth policy of buying. Furnaces that are in operation still have good stocks, which they do not seem to reduce very much. Prices are holding steady at recent levels. The commonly quoted Cleveland price for outside shipment remains at $16.50, but $16.25 and probably lower has not disappeared in competitive sections. While $16.75 is being quoted in the Valley district, a Lake furnace has taken some business at $17 for shipment to a point having the same freight rate from both producing points. In Michigan, the market is firm at $17.50. There is no activity in basic or low phosphorus iron.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$18.00
S'th'n fdy., sil. 1.75 to 2.25	21.50
Malleable	18.00
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	16.00
Stand. low phos., Valley furn	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Sheets. — The demand is rather spotty and slowing down, although it is good for this season of the year. Shipments exceed new business, and some of the mills that have had good backlogs are able to make quicker deliveries than recently. The only change in the price situation is the settling of black sheets to a rather common quotation of 2.60c., Pittsburgh. Although that price had appeared recently, it did not become common until the past week. Other sheet prices are unchanged. Blue annealed sheets range from 1.90c. to

2c., Pittsburgh. The minimum on galvanized sheets is 3.40c. and 3.45c., Valley.

Strip Steel.—Demand for both hot and cold-rolled strip shows some tapering off. Most business in hot-rolled material is in specifications against contracts. Plate makers are feeling keenly the competition of hot strip mills on lighter gages. Prices on wide material continue very irregular. Net prices are rather commonly quoted, which in some cases figure below 1.75c., Pittsburgh, on cold-rolled strip, 2.65c., Cleveland, has become more general for 3 tons and over. Small lots are still bringing 2.75c. Fender stock is holding at 4.10c. for No. 20 gage.

Cold-Finished Steel.—Demand from the automotive industry continues fairly active. Some new business is coming from makers of Ford parts. The price is firm.

Old Material.—The market shows little life and a weak tone, although there is no change in prices. Activity during the week was confined to small purchases of heavy melting steel and blast furnace scrap, mostly for delivery to Cleveland mills against outstanding orders. These brought quoted prices, except on some No. 1 heavy melting steel scrap for a mill exacting in its requirements, for which dealers paid $13.50. The market is weak in the Valley district. Dealers are paying $14 for No. 1 heavy melting steel for Youngstown and Sharon deliveries.

Prices per gross ton, deliv'd consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.00 to $13.25
No. 2 heavy melting steel	12.50 to 12.75
Compressed sheet steel	12.50 to 13.00
Light bundled sheet stamp'gs	11.50 to 11.75
Drop forge flashings	11.50 to 11.75
Machine shop turnings	7.00 to 7.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 13.75
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops	16.50 to 17.00
Low phos., billet, bloom and slab crops	17.00 to 17.50
Low phos. sheet bar crops	16.50 to 17.00
Low phos. plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	9.00 to 9.25
Mixed bor'gs and short turn'gs	9.00 to 9.25
No. 2 busheling	9.00 to 9.25
Cupola Grades	
No. 1 cast	16.00 to 16.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	16.75 to 17.25
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Coke.—A large share of foundries are under contract and new demand for foundry coke is limited to car lots. Prices are unchanged at $7.75, Painesville, for Ohio by-product foundry coke and $3.25 to $4.85 for Connellsville foundry coke. There is some activity in by-product coke for industrial uses. This is quoted at $4.50, Ohio ovens, for both egg and nut grades.

Bolts, Nuts and Rivets.—The demand continues fair in specifications against contracts. The volume of orders is about the same as last month.

Semi-Finished Steel.—Specifications are holding up well, but there is little new business. Quotations are unchanged at $32.50 to $33, Cleveland, for sheet bars, billets and slabs. The higher price evidently applies to orders for shipment to points where the seller has a freight advantage.

Wire Products.—A spurt in wire business has followed the recent $2 a ton price reduction. Nails are only moderately active. Some pressure is being made by car lot buyers in consuming industries to obtain the $2.55 per keg price that jobbers pay.

Warehouse Business.—Sales, which declined during the holiday week, have again picked up and are about the same in volume as during June. Prices are holding steadily except on black and galvanized sheets, which are reflecting the weakness of mill prices.

Reinforcing Bars.—Demand is slow, being limited to small lots. Prices are irregular. Rail steel bars are commonly quoted at 1.75c., mill.

Youngstown

Steel Production in Mahoning Valley Averages 75 Per Cent, a Gain of 5 Points

YOUNGSTOWN, July 17.—Iron and steel production schedules in the Mahoning Valley average fully 75 per cent this week, a gain of 5 points, compared with the production rate of recent weeks. The increased scheduling is directly attributable to enlarged business and affects steel ingots, pipe and plates in particular. Steel sheets, tin plate and hot strip mills are holding the gains of recent weeks.

Of 53 independent open-hearth furnaces, for example, 38 are scheduled this week, a gain of one over the preceding week and comparing with a recent low of 32 melting. Of 127 Valley sheet mills, 113 are under power, which approaches the high mark of the year. Tin mills are operating close to capacity, with a substantial backlog; a gain is seen in active pipe mills, with 14 of 20 under power.

The Youngstown Sheet & Tube Co. this week blew out one of its two Hubbard blast furnaces, because of slack operations by the Valley Mould & Iron Corporation nearby. The Hubbard stacks supply hot metal to the Valley Mould company. This leaves 21 of 37 blast furnaces in the Youngstown district in action, producing about 68 per cent of the total rated capacity.

The Carnegie Steel Co. has five of six furnaces blowing at the Ohio works, one being down for overhauling and enlargement. The Sheet & Tube company is operating five of its nine stacks in the Youngstown district, while the Republic company has four furnaces in blast.

Independents will follow the lead of the Carnegie Steel Co. in advancing the price of merchant bars, plates and shapes $2 per ton, to 2c. per lb. for fourth quarter delivery.

Worcester Manufacturers Working Full Time

Reports from 42 manufacturing plants in the Worcester, Mass., vicinity are regularly made to the local safety council, which not only records the number of lost-time accidents, but the number of employees and the hours worked. From these it may be determined that while the number of men employed is practically the same as a year ago, the number of hours worked almost doubled.

As summarized in a bulletin issued by the Worcester Bank & Trust Co., it appears that in May, 1928, 23,417 people employed in forty-two manufacturing plants of Worcester and vicinity worked 4,936,776 man hours. In May, 1927, 23,228 employees of the same plants worked 2,812,855 hours.

The number of employees increased but slightly, comparing the month this year and last. But the total number of hours worked by them increased tremendously. The gain of 2,123,921 hours was 80 per cent. Average daily employment per person increased from five hours to eight hours. The reporting plants include most of the large establishments of the city; among them are the American Steel & Wire Co., Crompton & Knowles Loom Works, Norton Co., Reed & Prince Mfg. Co., Graton & Knight Mfg. Co., Wickwire-Spencer Steel Co., the Whitin Machine Works and the American Optical Co. There is no reason to doubt that local plants not included in the group of forty-two have averaged to have much the same experience.

Building permits have dropped very sharply. The city, therefore, has the conflicting experience of full-time employment in manufacturing and considerable unemployment in the building trades.

The satisfactory condition of dealer stocks of used automobiles makes possible the promotion of new car sales on a larger basis than usual during the summer months, says *Automotive Industries.* This year the new car sales records of the spring and early summer have been accompanied by a more even movement of used cars, resulting only in limited stocks at any time in the past two months.

San Francisco

Improved Steel Demand—Water Mains for Oakland —Heavy Concrete Bar Business

SAN FRANCISCO, July 14 (*By Air Mail*).—Third-quarter trading is getting well under way and demand has improved during the past two weeks. A number of new structural steel projects have come out for figures and architects and engineers report a good volume of business on the boards which should come forth for bids shortly. Reinforcing steel bars and shapes continue to be the most active products. Of more than usual interest is the call for bids by the East Bay Municipal Utility District, Oakland, for a water distributing system calling for 4500 tons of plates or 22,000 tons of cast iron pipe.

Building permits issued during June in Los Angeles totaled $9,190,434, as compared with $9,355,175 for the same month a year ago. Seattle had the biggest building month in the history of the city, as noted last week. Portland's permits totaled $2,639,753, a gain of $270,612 over June, 1927. Oakland was the third leading city on the Coast during June, with a total of $4,209,512.

Pig Iron.—The foundry trade, with the exception of those classes of plants engaged in producing sanitary ware, stoves and other manufacturing specialties, continues to operate upon a limited basis, with only sufficient advance orders on hand to keep them running a day or two. The majority of the foundries on the Pacific Coast are classified as jobbing plants, and demand and sales have not been heavy. A shipment of Indian iron has just been unloaded on the Coast, 300 tons going to Bay district melters and 300 tons to users in the Los Angeles district. No change in prices is noted.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards of reinforcing steel bars were the heaviest in over five weeks and totaled 1756 tons, as noted elsewhere. Outstanding among pending business is 2288 tons for a drainage improvement project at Los Angeles and 400 tons for highway in Ventura County, Cal. Prices on out-of-stock material in the San Francisco district have strengthened to some extent and while better than 2c. is being quoted occasionally, this figure now represents the general run.

Plates.—One of the largest plate inquiries that has come before plate fabricators this year calls for 4500 tons for small water mains in Oakland for the East Bay Municipal Utility District, bids on which go in Aug. 17. Alternate bids will also be taken on steel lined concrete pipe, lock-bar, electric welded steel pipe and cast iron pipe. H. Gould of Sacramento secured the only award, which involved 100 tons of 24-in. riveted steel pipe for Sacramento. Prices continue to range from 2.25c. to 2.30c., though a large tonnage, it is believed, would probably bring forth 2.20c. c.i.f.

Shapes.—Demand for structural steel shapes continues active and awards recently totaled over 3300 tons. Included among the new pending projects are 455 tons for a bridge at Saugus, Cal., 600 tons for an apartment in San Francisco, 570 tons for a bridge at Ventura, Cal., and 200 tons for a viaduct in Seattle. Plain material is firm at 2.35c. c.i.f.

Cast Iron Pipe.—A slight improvement in demand for cast iron pipe is noted, although sales this week were limited to one or two projects. Burbank, Cal., placed 109 tons of 4-in. Class B pipe with the Grinnell Co., 67 tons of 6-in. Class 250 with the Pacific States Cast Iron Pipe Co. and 87 tons of 8 and 10-in. Class 250 with the American Cast Iron Pipe Co. San Diego awarded the Miracle Construction Co., San Diego, 102 tons of 4 and 6-in. Class B. The B. Nicoll Co. took 149 tons of 14-in. Class B for Puyallup, Wash., and I. L. Ryder, San Carlos, Cal., secured 109 tons of 3 to 6-in. Class 150 pipe for San Luis Obispo, Cal. The quantities involved in the East Bay Municipal Utility District project are as follows: 3600 tons of 44-in., 9000 tons of 30-in., 325 tons of 34-in., 6600 tons of 36-in. and 2800 tons of 24-in. Class C pipe. Bids on this material will be opened Aug. 17. The Pacific States Cast Iron Pipe Co. was low bidder on 202 tons of 2 to 6-in. Class B pipe for Phoenix, Ariz. Wells, Nev., which last month took figures on 224 tons of 4 to 10-in. Class C pipe, finally purchased Armco iron pipe through the Burnham Mfg. Co. at Cross, Utah. Bids have been opened on 2121 tons of 8 and 12-in. Class 350 pipe for Los Angeles and on 271 tons of 48-in. pipe for a sewer in Seattle, Wash. New inquiries include 133 tons of 6 to 10-in. Class B pipe for South Pasadena, Cal., bids opening July 25. Tracy, Cal., will open bids on Aug. 7 for 416 tons of 4 to 12-in. Class B.

Steel Pipe.—Little new business in standard pipe and oil country goods has been reported of late. John Strona, Pomona, Cal., secured 194 tons of 4-in. standard and 6-in. O. D. pipe for Chino, Cal. No large inquiries are pending.

Coke.—One large importer of English coke has just unloaded 3500 tons of beehive and by-product coke in San Francisco to apply against contracts placed some time ago. Approximately 1500 tons of this material will be reshipped to Portland and Seattle. English beehive coke is quoted at $16 a net ton, delivered incoming dock, while by-product material ranges from $11.50 to $13 a net ton.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue ann'l'd sheets (No. 10)	3.90c.
Galv. sheets (No. 24)	5.50c.
Struc. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100-lb. keg	3.40

Canada

New Business Active and Operations Maintain Recent High Level—Strong Structural Demand

TORONTO, July 17.—New business and operating activities of the iron and steel and allied industries of Canada continue to hold the high position reached earlier in the year, and at the moment the various companies concerned believe the present rate of operations will continue for some months to come.

While rail mills have secured considerable orders from the Canadian railroads, rolling stock manufacturers have not been so fortunate, and the latter point out that the roads continue to hold their rolling stock purchases to a minimum, despite the fact that there is apparently a strong need for replacements. Most concerns producing rolling stock have entered into the manufacture of mining equipment or some other special line and it is to the latter that credit is given for the continued high rate of operations. The automotive industry of this country is also flourishing. Agricultural implement makers are experiencing one of their best years and sanitary ware and radiator manufacturing companies also are optimistic in their statements regarding present and future activities.

Pig Iron.—Following the lull during the first week of July, business has again returned to the stronger position. Some advance buying has been done, totaling about 3000 tons for third-quarter delivery. The majority of consumers, however, have covered up to the end of September, and local blast furnace representatives do not expect much additional in the way of big tonnage forward contracts. Spot buying in lots of from one to two cars is the feature, and as orders of this nature are fairly numerous, total sales for the week reached a good level. A few inquiries

are out for 200 to 300 tons for immediate delivery, which are expected to be closed within the next few days. Prices appear firm at the present level, with little prospect of an early change here. In the Montreal district, however, shading is being resorted to in order to meet outside competition, but the general list is unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil 2.25 to 2.75	$23.10 to $23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	24.50 to 25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	23.50 to 24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—While a few orders of 1000 tons and upward were closed during the week, the total volume of sales were somewhat below those of the three or four weeks previous. A few big orders are in prospect, but the bulk of current business is for small tonnages. It is expected that the T. Eaton Co., Toronto, will require perhaps 10,000 tons of steel for its new structure. Approximately 2000 tons of structural and 500 tons of reinforcing bars will be required for the Miller Court & Co., Ltd., Stock Exchange Building, Vancouver, and 600 tons of reinforcing bars will be purchased for the factory and stores on Mount Royal Avenue, Montreal, for the Canadian Waist Co. Numerous other orders are pending in which from 100 to 500 tons of steel will be required. Canadian structural steel fabricators and producers of reinforcing bars report plant operations at capacity, with some working at double time to supply the demand.

Old Material.—Sales for the past few days showed general improvement. The seasonal decline in business has not been so striking as it was a year ago. With the majority of consumers who place advance contracts covered up to the end of September, current demand is mostly for small tonnages for immediate delivery. The consumption of old material throughout eastern Canada is from 15 to 20 per cent greater than a year ago, and scrap dealers are naturally securing a larger volume of business. The present price situation, however, is far from satisfactory. A general strengthening of the United States market is about the only possibility Canadian dealers have of a stronger market demand and higher prices here. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$9.00	$7.00
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	6.50
Cast borings	7.50	5.00
Steel turnings	7.00	5.50
Wrought pipe	5.00	5.00
Steel axles	14.00	20.00
Axles, wrought iron	16.00	22.00
No. 1 machinery cast	....	16.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

St. Louis

Reduced Pig Iron Price to Stimulate Buying—Improvement in Steel Business

ST. LOUIS, July 17.—Although the St. Louis Gas & Coke Corporation has not formally reduced its price in line with the cut of 50 cents a ton made by Chicago makers, as reported in THE IRON AGE last week, the Granite City concern has let it be known that it will meet all competition, and has been making sales on the basis of the new Chicago price when necessary. Its sales last week totaled 4500 tons, including 2000 tons of basic to an East Side melter and 2500 tons of foundry iron in lots tapering downward from 500 tons, which went to a St. Louis melter. The new Chicago price, the lowest since 1915, is expected to stimulate buying in this district, especially as there is considerable iron to be bought for the third quarter, and sellers look for a heavy movement this week. While there are no definite inquiries pending, a number of melters are said to be ready to buy.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.00
N'th'n No. 2 fdy., deliv'd St. Louis	20.16
Southern No. 2 fdy., deliv'd	19.92
Northern malleable, deliv'd	20.16
Northern basic, deliv'd	20.16

Freight rates: 81c. Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Dealers in domestic grades of coke have shown very little interest so far in their requirements for next fall, and it is not expected that they will do so until after Aug. 1. Buying of foundry grades is light.

Old Material.—About the only item on the old material list that is showing any life is rails for rerolling, the various rolling mills in the district showing greater activity than other consumers. Buying of other items is light, and neither dealers, who are about covered on contracts, nor consumers, who say they have sufficient stocks of old material for the present, are showing any interest in the market. Miscellaneous standard section rails, railroad springs, and cast iron car wheels are 25c. lower; steel car axles, wrought iron bars and transoms and No. 1 railroad wrought are 50c. lower. Railroad lists, which continue heavy, include the following: Southern Railway system, 6962 tons; Chesapeake & Ohio, 4262 tons; Terminal Railway Association of St. Louis, 3523 tons; Chicago, Milwaukee & St. Paul and Chicago & Alton, 1300 tons each; Chicago, Rock Island & Pacific, 1500 tons; Nickel Plate, 600 tons miscellaneous, and four carloads of rail; Texas & Pacific, 575 tons miscellaneous and 250 tons axles; International-Great Northern, 885 tons; Cotton Belt, 14 carloads; and Pullman Co., St. Louis, four carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel	$10.75 to $11.25
No. 1 locomotive tires	12.00 to 12.50
Heavy shoveling steel	10.75 to 11.25
Miscell. stand.-sec. rails, includ'g frogs, sw'ches and guards, cut apart	12.00 to 12.50
Railroad springs	13.00 to 13.50
Bundled sheets	8.50 to 9.00
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.25 to 9.75
Cast iron borings	8.50 to 9.00
Iron rails	13.00 to 13.50
Rails for rolling	13.00 to 13.50
Machine shop turnings	6.25 to 6.75
Steel car axles	16.75 to 17.25
Iron car axles	25.50 to 26.00
Wrot. iron bars and trans.	18.00 to 18.50
No. 1 railroad wrought	9.00 to 9.50
Steel rails, less than 3 ft.	15.00 to 15.50
Steel angle bars	11.50 to 12.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	13.00 to 13.50
Railroad malleable	11.25 to 11.75
No. 1 railroad cast	13.00 to 13.50
Stove plate	11.00 to 11.50
Agricult. malleable	12.00 to 12.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Finished Iron and Steel.—The Granite City Steel Co., during its shutdown for the week of the Fourth, was able to book a very fair backlog tonnage, and all of its units are operating 100 per cent, except the galvanizing department, which is at about 80 per cent of capacity, as compared to 50 per cent two weeks ago. The last few days have shown a marked improvement in incoming business, which is slightly behind the corresponding period in June, but well up to the normal for this time of year. Demand is coming from a diversified line of consumers, and the volume is being maintained despite virtual inactivity of car builders and oil field operators, who ordinarily use large tonnages. Prices are considerably more stable than they were a few weeks ago, although still unsatisfactory, due to very low levels. Warehouse busi-

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struct. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galv. sheets (No. 24)	5.25c.
Blue ann'l'd sheets (No. 10)	3.60c.
Black corrug. sheets (No. 24)	4.50c.
Galv. corrug. sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	70
Less than 100 lb	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

ness for June was better than May, and July so far has been fair, buying in the St. Louis industrial district holding its own, but with declines in the oil fields and other country sections. Railroads are expected to issue third-quarter requisitions for plates, shapes and bars during the week. Business with structural fabricators is quiet.

Boston

Structural Fabricators Well Filled Up With Orders—More Steel Scrap Exported

BOSTON, July 17.—The Chapman Valve Mfg. Co., Springfield, Mass., is now said to have bought 500 tons No. 2 plain New York State pig iron for third and fourth quarter delivery, 500 tons No. 2X Buffalo, and 500 tons No. 1X Buffalo iron, the latter from a steel mill, at prices above those quoted on other irons. The foundry's original inquiry was for 2500 tons. The major portion of iron sold in this territory the past fortnight has been bought on a basis of $17 a ton, Buffalo furnace, for No. 2X, despite the fact that irons are still available at $16 and $16.50 a ton, base Buffalo furnace, or the equivalent. Aside from the Chapman Valve Mfg. Co. business, sales the past week were largely of car lots of more or less special analysis irons, for which full differentials were paid.

Foundry iron prices per gross ton deliv'd to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Va., sil. 1.75 to 2.25	25.71
Va., sil. 2.25 to 2.75	26.21
Ala., sil. 1.75 to 2.25	22.41 to 24.27
Ala., sil. 2.25 to 2.75	22.91 to 24.77

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—July shipments of by-product foundry coke have been a little ahead of those in July, last year. New England melt of iron is not increasing, although certain foundries are busier than they have been. The New England Coal & Coke Co. and the Providence Gas Co. are still making shipments on a basis of $11 a ton within a $3.10 freight rate zone.

Shapes and Plates.—New England steel fabricators have more unfilled business on their books than in a long time. Based on present operations, some of them are booked through the remainder of 1928, while the largest, with increased operations, are sold up through September. Prices named by fabricators are on a firmer basis. Mill deliveries are becoming uncertain, and mills are more often obtaining 1.90c. per lb., base Pittsburgh. Most of the large fabricators are protected through the third quarter at second quarter prices for both plates and shapes.

Warehouse Business.—The movement of iron and steel out of warehouse is holding up remarkably well for July. Small iron workers, although not as active as they were a month ago, continue to take good weekly tonnages from warehouses, mostly of round and square bars and angles. Warehouse stocks today are considerably smaller than they were a year ago, consequently there is more or less buying among the trade to fill orders. Wire nails have been cut 5c. to 10c. per 100 lb. From stock they are $3.40 per keg, and for mill shipments, $2.65 in car lots and $2.90 in less than car lots. New extras have been issued on cut nails, which brings the average cost to buyer practically to the wire nail basis.

Old Material.—A steamer with 4303 tons of scrap cleared Boston on July 10 for Danzig. This shipment included rails as well as No. 1 and No. 2 steel. Another steamer will load 4000 to 5000 tons for export within the next fortnight. Prices for material on this boat have been dropped about 25c. per ton, No. 1 steel now fetching $9 a ton on cars dock, here, and No. 2, $8.50 to $8.75. Aside from the export demand, the old material market is quiet. Prices Pennsylvania mills are willing to pay for scrap are so low that shippers cannot do business except at a loss. To illustrate: the best a Weirton mill is offering for No. 1 heavy melting steel is $6.70 to $6.75 a ton on cars at shipping point. With a $2 a ton cost for handling, plus the cost of other incidentals, shippers cannot profitably operate.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.00 to $8.50
Scrap T rails	8.00 to 8.50
Scrap girder rails	7.50 to 8.00
No. 1 railroad wrought	9.00 to 9.50
No. 1 yard wrought	7.00 to 7.50
Machine shop turnings	5.00 to 5.50
Cast iron borings (steel works and rolling mill)	5.10 to 5.60
Bundled skeleton, long	6.50 to 7.00
Forge flashings	6.50 to 7.00
Blast furnace borings and turnings	5.00 to 5.50
Forge scrap	5.50 to 6.00
Shafting	12.00 to 12.50
Steel car axles	14.50 to 15.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	7.00 to 7.50
Rails for rolling	9.50 to 10.00
Cast iron borings, chemical	9.50 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	$13.50 to $14.00
No. 1 machinery cast	14.00 to 14.50
No. 2 machinery cast	12.50 to 13.50
Stove plate	10.00 to 10.50
Railroad malleable	13.50 to 14.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Birmingham

Steel Backlogs Being Maintained With Finishing Mills Active—Price Tendency Firm

BIRMINGHAM, July 16.—New sales by pig iron producers last week showed slight improvement over the previous week. Total bookings were ahead of production. Some consumers are covering their requirements through July and August and a few orders have been booked as needs are presented. Pressure pipe makers are among the heavy buyers. Soil pipe plants, stove foundries and machine shops generally are largely uncovered for the quarter's requirements. Shipments are active and ahead of the make. For the past several days the Tennessee company has been alternating its Ensley furnaces between basic and foundry iron with changes being made each day. The No. 2 Bessemer furnace of the company has been changed from recarburizing iron to foundry iron. Operations by the other companies are the same as last week. Seventeen furnaces are in blast.

Prices per gross ton f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$15.50
No. 1 fdy., 2.25 to 2.75 sil.	16.00
Basic	$15.00 to 16.00

Finished Steel.—The volume of new business for the past week was close to that of the past several weeks. The finishing mills continue active and backlogs are being maintained so far. Prices show a firmer tendency than for several weeks. Bar quotations are now 2.05c. to 2.15c. New bookings of bar manufacturers and structural steel fabricators will easily support operations at the recent level. Structural steel orders booked by the Virginia Bridge & Iron Co. call for 1530 tons, as reported elsewhere. The Tennessee company has taken off all of its open-hearth furnaces at Ensley

and increased its active open hearths at Fairfield from five to six. The Gulf States Steel Co. continues to work three at Alabama City.

Cast Iron Pipe.—New lettings have improved somewhat and are now holding up the unfilled tonnage at a satisfactory level. Inquiries are confined largely to private business. The pressure pipe plants in the district are operating at around 85 per cent capacity and shipments lately have been sufficient to take care of all pipe produced. The soil pipe business is still backward and plant operations are light. Quotations continue at $34 to $35 on 6 in. and larger sizes.

Coke.—Shipments are keeping up well, but there is little new contracting on foundry coke, as most consumers have already covered for the last half. A small amount of spot business is being transacted. Quotations remain at $5 for both spot and contract.

Old Material. — Practically no change can be detected in the market. The only activity is found in a few sales from time to time in carload lots. There has been no demand in several weeks. Prices are nominal and unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$8.50 to	$9.00
Scrap steel rails	11.00 to	11.50
Short shoveling turnings	7.50 to	8.00
Cast iron borings		8.00
Stove plate		13.50
Steel axles	19.00 to	20.00
Iron axles	20.00 to	21.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		13.00
No. 1 cast		14.25
Tramcar wheels	12.50 to	13.50
Cast iron carwheels	12.00 to	13.00
Cast iron borings, chem.	13.50 to	14.00

Cincinnati

Revival of Interest in Pig Iron—Coke Prices Decline —Steel Prices Firmer

CINCINNATI, July 17.—Pig iron buyers are showing greater interest in requirements for the remainder of the year and consequently sales and inquiries are tending upward. Significance is attached to the fact that the Standard Sanitary Mfg. Co. is expected to purchase foundry iron for its Louisville, Ky., plant this week, while a large consumer at Hamilton, Ohio, probably will close in a few days for 5000 tons to be shipped during the last half. At Piqua, Ohio, the Favorite Stove & Range Co. is asking for bids on 600 tons of foundry. The amount of iron being taken by melters on current contracts is fairly satisfactory for the summer season. Competition for business is principally between Lake Erie furnaces and a southern Ohio producer.

In the case of the former, quotations ranging from $16 to $16.25, base furnace, have been successful in obtaining bookings, but the freight advantage to many points in southern Ohio is strongly in favor of the latter. Southern Ohio foundry iron remains nominally at $18, base Ironton. However, the two merchant iron interests at Ironton have only a limited tonnage of iron, mostly in special grades, to offer. There is little likelihood of either company resuming operation of its blast furnaces in the near future. Tennessee and Alabama irons are firm at $15.50, base Birmingham. There has been no change in Jackson County silvery, which is steady at $25, base Jackson, for 8 per cent.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89
So. Ohio malleable	$20.14 to 20.39
Ala. fdy., sil. 1.75 to 2.25	19.19
Ala. fdy., sil. 2.25 to 2.75	19.69
Tenn. fdy., sil. 1.75 to 2.25	19.19
So'th'n Ohio silvery 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—There is an underlying tone of firmness to the market. Orders and specifications have called for small miscellaneous lots of material, but in the aggregate have attained somewhat liberal proportions. Bars, structural shapes and plates are in fair demand at 1.85c., base, Pittsburgh, for attractive tonnages and 1.90c. for the ordinary run of orders. In common wire nails there has been a firming up of prices. Some Eastern producers have announced that they will not sell nails under $2.76 per keg, delivered in Cincinnati, which is equivalent to $2.55, Pittsburgh, plus the full all-rail rate to this city. However, at least two makers are willing to accept business at $2.69, figuring on a base price of $2.55 and a 14c. barge rate from Ironton to Cincinnati. District sheet mills report that bookings are holding up well in the face of a slackening in operations among certain classes of consumers. The output of steel sheets continues at about 90 per cent of capacity, but backlogs have been reduced in the past few weeks so that the maintenance of present schedules will depend upon the amount of tonnage obtained in the next week or two. Quotations have not changed and indications are that the market is becoming stabilized at current prices of 2c., base Pittsburgh, for blue annealed, 3.50c. for galvanized, 2.65c. for black and 4c. for automobile body stock. Reinforcing bars are firm at 1.80c., base mill, for rail steel material and 1.85c. to 1.90c., base Pittsburgh, for new billet bars.

Warehouse Business. — Shipments out of local warehouses in the first half of July were slightly less than in the last two weeks of June, the lagging demand for structural steel having been responsible for the decline in volume. Prices are steady and unchanged.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-weld. steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Coke.—The coke market is rather sluggish and the downward trend of prices, especially in by-product grades, reflects the increasing severity of competition among makers. An Indianapolis company has cut its price of foundry coke $1 a ton for delivery to points in Indiana. The decline was caused by low quotations made by a Birmingham producer and by a Terre Haute, Ind., maker. However, the schedule for delivery to this city remains unchanged at $7 per net ton, f.o.b. ovens. Whether this price will be shaded depends upon the course taken in the next week or two by an Ashland, Ky., manufacturer. The Procter & Gamble Co., Cincinnati, is reported to have bought 5000 tons of by-product furnace coke from a southern Ohio seller. In recent years this business has gone to a Wise County producer of beehive coke. An Ohio River user of furnace coke is inquiring for 2500 tons for delivery in the first three months of 1929.

Foundry coke prices per net ton deliv'd Cincinnati: By-prod. coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material. — There has been little activity in the scrap market. Railroads are reported to have got fairly good prices for the items on their July lists. Steel plants in this district are accepting moderate tonnages on present contracts. Blast furnace and foundry grades are quiet. Prices are unchanged.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$10.75 to $11.25
Scrap rails for melting	10.75 to 11.25
Loose sheet clippings	8.25 to 8.75
Bundled sheets	9.25 to 9.75
Cast iron borings	7.50 to 8.00
Machine shop turnings	7.00 to 7.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.00 to 6.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels	11.50 to 12.00
No. 1 machinery cast	15.25 to 15.75
No. 1 railroad cast	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.00 to 11.50

Detroit

June Automobile Production Records Considerably Ahead of June, 1927—Employment Gains

DETROIT, July 16.—Final figures for June indicate that automobile production is not undergoing the usual seasonal slump. Some individual companies are still making records and the industry as a whole is in very much better condition than it was at this time last year. It is apparent that Chevrolet production made a new record, with an output of approximately 130,000 cars and trucks, or better than 20,000 ahead of June, 1927, but 10,000 units less than the previous month of this year. The basic schedules for the next three months are set at 100,000 units a month. The Chevrolet company is about to begin construction on a new foundry unit at Saginaw, which will cost approximately $4,000,000 and have a melting capacity of 1700 tons a day.

Dodge production since the first of the year is approximately 20 per cent ahead of the same period of 1927. June production of Graham-Paige Motors Corporation has for the fourth time broken records, with a total of 8829 units, showing an increase of 318 units over the previous month. The Hudson Motor Car Co. shows a June record of 31,160 units, which may be compared with 23,084 units for June of 1927. The first six months of the current year show a total of 183,065 as against 168,336 for the first six months of 1927. The Hupp Motor Car Corporation in the first six months of 1928 shipped 38,424 cars. This compares with 22,310 cars in the six months of 1927. Shipments to Canada reflect the same progress. June, 1928, is the largest June in this respect and 7 per cent ahead of June, 1927.

Marmon production for the first six months of this year totals approximately 13,900 cars compared with 7311 for the same period of 1927. The Oakland Motor Car Co., to July 1, shows a total sales of 161,548 units, or a gain of 62 per cent over the first half of 1927. The Packard Motor Car Co., after two weeks shutdown for vacations, has resumed operations at full capacity. A new record was made last month by Reo Motor Car Co., with 6133 units, compared with 6121 in the previous month and with 4479 in June of last year. The Studebaker Corporation shows a June total of 13,000 units as compared with 8600 for June a year ago.

The index for the Employers' Association shows an increase of 1822 for the past week, bringing the total to 264,473, which represents the combined payrolls of approximately two-thirds of the city's industries. The corresponding figure for a year ago was 194,704 persons or 69,769 less than at the present time.

President Kuhn of the Truscon Steel Co. states that all the company's plants are running at capacity and with no immediate let down apparent.

The Motor Wheel Corporation sales for the first half of 1928 are somewhat more than $13,000,000 or 25 per cent better than the sales for the same period of 1927. An addition to the pressed steel plant is to be started immediately and will be rushed to completion as early as possible this fall. This addition will be approximately 74 x 500 ft.

Auto body sheet stands at 4c., Pittsburgh, and blue annealed sheet at 2 to 2.10c., Pittsburgh. Cold finished bars remain at 2.10c., Pittsburgh, and hot rolled 3 in. and narrower 2.20 to 2.30c., 3 to 6 in., 1.85 to 2.10c., and 6 in. and wider 1.75 to 1.90c., Pittsburgh. Structural bars, shapes and plates remain at 1.85c. to 1.90c., Pittsburgh.

Shipments of pig iron in this district are considerably above the June figures. This is due to heavy production of automobile castings for new models. Melters generally have covered for the third quarter and they anticipate good production during this period.

Scrap prices are unchanged.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$11.00 to $11.50
Borings and short turnings	7.00 to 7.50
Long turnings	5.75 to 6.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 6.50
Flashings	9.00 to 9.50

Buffalo

Steel Mill Operations Average 80 Per Cent—10,000-Ton Sale of Heavy Melting Steel at $13.75

BUFFALO, July 17.—With very few sizable inquiries out, a fair tonnage of pig iron has been sold in 50 to 200-ton lots. The price realized on sales in the district was $17, Buffalo. Most of the business placed at points to the east has been sold at a price which figures back to $16.50, Buffalo, taking the barge rate into consideration. An inquiry is out for 1000 tons of malleable and another from Connecticut is for 600 tons of malleable and silvery iron.

In line with the Hanna Furnace Co.'s improvement program at Buffalo, its No. 1 stack, which is now operating on silvery iron, will be blown out about Aug. 1 and one of its larger furnaces, recently equipped to produce silvery iron, will then go onto that grade for regular production.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$17.00
No. 2X fdy., sil. 2.25 to 2.75	17.50
No. 1X fdy., sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	$16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Mill operation is at about 80 per cent, with bookings fair. Bars, shapes and plates are being quoted at 2c., Buffalo, for third quarter delivery. Considerable sheet business has been taken. On black sheets, prices range from 2.60c. to 2.70c. Shop operations are better, with drop forging shops doing particularly well. The largest structural letting was 400 tons for the Mayflower apartments.

Old Material.—A local mill has bought 10,000 tons of heavy melting steel at $13.75. A few small sales of No. 1 cast, malleable and short steel rails have been made, but otherwise the market has been very quiet. The restrictions and suspensions put into effect by the two largest consumers are still in effect. Most of the scrap yards are shut down.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.25
No. 2 heavy melting steel	12.25 to 12.75
Scrap rails	13.00 to 13.50
Hydraulic comp. sheets	12.25 to 12.75
Hand bundled sheets	8.00 to 8.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	12.25 to 12.75
Hvy. steel axle turnings	12.00 to 12.50
Machine shop turnings	7.00 to 7.50
Acid Open-Hearth Grades	
R'lr'd knuckles and couplers	15.00
R'lr'd coil and leaf springs	15.00 to 16.00
Rolled steel wheels	15.00
Low phos. billet and bloom ends	16.00 to 16.50
Electric Furnace Grades	
Hvy. steel axle turnings	12.00 to 12.50
Short shov. steel turnings	9.00 to 9.50
Blast Furnace Grades	
Short shov. steel turnings	9.00 to 9.50
Short mixed borings and turnings	9.00 to 9.50
Cast iron borings	9.00 to 9.50
No. 2 busheling	9.00 to 9.25
Rolling Mill Grades	
Steel car axles	15.50 to 16.00
Iron axles	19.50 to 20.00
No. 1 railroad wrought	12.00 to 12.50
Cupola Grades	
No. 1 machinery cast	14.25 to 14.75
Stove plate	13.00 to 13.25
Locomotive grate bars	11.25 to 11.75
Steel rails, 3 ft. and under	16.50
Cast iron carwheels	12.00 to 12.50
Malleable Grades	
Industrial	15.00
Railroad	15.00
Agricultural	15.00

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struct. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.70c. to 5.05c.
Blue ann'l'd sheets (No. 10)	3.70c.
Com. wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

Non-Ferrous Metal Markets

Tin Recovers in More Active Trading — Copper Position Strong — Lead and Zinc Steady

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 17	July 16	July 14	July 13	July 12	July 11
Lake copper, New York	14.75	14.75	14.75	14.75	14.75	14.75
Electrolytic copper, N. Y.*	14.50	14.50	14.50	14.50	14.50	14.50
Straits tin, spot, N. Y.	47.25	46.25	....	46.25	46.00	46.25
Lead, New York	6.20	6.20	6.20	6.20	6.20	6.20
Lead, St. Louis	6.05	6.05	6.05	6.05	6.05	6.05
Zinc, New York	6.55	6.55	6.55	6.55	6.55	6.55
Zinc, St. Louis	6.20	6.20	6.20	6.20	6.20	6.20

*Refinery quotation; delivered price ¼c. higher.

Copper.—Although current buying of copper is light, copper producers are in an unusually strong position, being sold up tightly for July and also almost completely for August. It is difficult for buyers to obtain even a carload for spot shipment, as refiners are reserving their output for contract customers. Some copper for August is still to be bought, while nearly all consumers are uncovered for September. Producers are well satisfied with the present price situation, which is firm at 14.75c., delivered Connecticut Valley, for electrolytic, and there is no intimation of any intention to go above that level; in fact, producers would prefer to hold it there. Copper statistics for the first half reflect fully the present strong situation, with a reported decrease in refined stocks as of June 30 amounting to 7479 tons, although total stocks, including those in process, gained 2254 tons, the comparisons being made with the situation on the last day of May. Total domestic sales in the first half were 444,028 tons, more than half of the total of 824,844 tons sold in all of 1927, while foreign shipments were 352,088 tons in the six months, against 641,865 tons in the twelve months of 1927. The foreign demand is not now active, but the price of Copper Producers, Inc., remains unchanged at 15c., c.i.f. European ports.

Tin.—Following several uneventful days, the tin market resumed activity today (Tuesday) with a fairly strong demand, mostly from dealers, for August and September delivery, and the price advanced at the close of the trading to 47.25c. per lb., a gain of 1c. over Monday's price. About 300 tons changed hands. Last week sales were not more than 750 tons at prices fluctuating between 46c. and 46.25c. Consumers have not taken much interest in the market recently, but it is believed that they must soon come in for supplies, as their stocks are not

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	48.50c. to 49.50c.
Tin, bar	50.50c. to 51.50c.
Copper, Lake	15.75c.
Copper, electrolytic	15.50c.
Copper, castings	14.75c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.00c. to 12.50c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commerc'l grade,	30.00c. to 40.00c.
Solder, ½ and ½	31.50c. to 32.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	52.00c.
Tin, bar	56.00c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.75c.
Lead, American pig	7.00c.
Antimony, Asiatic	16.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	55.50c.
Solder, ½ and ½	30.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	19.25c.
Copper, hot rolled	24.00c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Seamless Tubes—	
Brass	24.12½c.
Copper	25.00c.
Brazed Brass Tubes	27.25c.
Brass Rods	17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc. sheets,, open	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products continue to be quoted at the advances of May 25. Zinc sheets are unchanged at 9.25c., base, and lead full sheets at 10c. to 10.25c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products. Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Zinc	9.25c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	24.12½c.
Copper	25.00c.
Rods—	
High brass	17.00c.
Naval brass	19.75c.
Wire—	
Copper	16.75c.
High brass	19.75c.
Copper in Rolls	22.50c.
Brazed Brass Tubing	27.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	12.625c.	14.00c.
Copper, hvy. and wire	12.50c.	13.50c.
Copper, light and bottoms	10.75c.	12.00c.
Brass, heavy	7.00c.	8.25c.
Brass, light	6.25c.	7.75c.
Hvy. Machine composition	9.75c.	11.00c.
No. 1 yel. brass turnings	8.75c.	9.50c.
No. 1 red brass or compos. t'ngs.	9.00c.	10.00c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.50c.	14.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	19.25c.
Copper, hot rolled	23.50c.
Copper, cold rolled, 14 oz. and heavier	25.75c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.62½c.
Copper	26.50c.
Brazed Brass Tubes	27.25c.
Brass Rods	17.00c.

reckoned as being large. During the dullness which prevailed in the local market last week, London almost completely disregarded the American situation, and the market there has been steady and stronger than here. London prices today were £213 for spot standard, £209 10s. for future standard, £216 for spot Straits, and the Singapore price was £210 15s.

Lead.—This metal has remained steady in price during the past week, with quotations of 6.05c., St. Louis, and 6.20c., New York, the latter being the price of the American Smelting & Refining Co., which is being generally followed in the outside market.

Zinc.—The day-to-day demand for zinc is fairly steady, but the market presents no new characteristics. Prices are firm at 6.20c. to 6.25c., East St. Louis, or 6.55c. to 6.60c., New York. The lower prices are for July shipment, a slight premium being asked for August and September. Ore production at Joplin jumped from 3500 tons in the first week of July to 12,000 tons last week; the ore price remains at $40 a ton.

Antimony.—The market is quiet but firm, with the Chinese metal quoted at 9.50c. per lb., New York, duty paid, for spot delivery, and at 9.75c. for future.

Nickel.—Ingot nickel in wholesale lots is unchanged at 35c.; shot nickel is 36c., and electrolytic nickel is 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, July 17.—Trade is light in all the metals. Copper has been held firmly for a number of weeks, even when demand has been light. Buyers are finding that they must pay the current price for their accumulating needs, but they decline to buy ahead. Lead has declined mainly because of a reduction of $2 a ton by the leading producer. Even at the reduced price demand is light and buyers are looking for a further decline. Tin is also lower than a week ago. The old metals are unchanged.

Prices, per lb., in carload lots: Lake copper, 14.87½c.; tin, 47.25c.; lead, 6.15c.; zinc, 6.30c.; in less-than-carload lots, antimony, 11.25c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.50c.; yellow brass, 7.25c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

WITH a bridge at Providence, R. I., requiring 1700 tons and 1000 tons in five junior high schools at Chicago, new reinforcing projects announced during the last week amounted to 4900 tons. The following awards total about 2900 tons:

BRIDGEPORT, CONN., 150 tons, building for Post Publishing Co., to Concrete Steel Co.

SCRANTON, PA., 140 tons, Medical-Arts Building, to Kalman Steel Co.

WESTMORELAND AND FAYETTE COUNTIES, PA., 125 tons, road work, Gray Brothers, Youngstown, to Truscon Steel Co.

CHICAGO, 220 tons, Fargo Avenue apartments, to Kalman Steel Co.

CHICAGO, 300 tons, building for William J. Igoe, to Kalman Steel Co.

CHICAGO, 260 tons, garage at 343 South Wabash Avenue, to Joseph T. Ryerson & Sons.

CHICAGO, 225 tons, garage at 914 Fair Oaks Avenue, to Calumet Steel Co.

CHICAGO, 200 tons, Austin High School, to Olney J. Dean & Co.

MAYWOOD, ILL., 200 tons, building for Public Service Co. of Northern Illinois, to American System of Reinforcing; previously reported to an unnamed bidder.

STATE OF ILLINOIS, 120 tons of rail steel bars for road work, to Calumet Steel Co.

ST. LOUIS, 375 tons; hotel at Eighth and Market Streets, 275 tons, and apartment house at Grand Boulevard and Russell Avenue, 100 tons, to Laclede Steel Co.

HELENA, MONT., 156 tons, State bridge on Laurel West highway, to unnamed interest.

OLYMPIA, WASH., 250 tons, State highway work, to Northwest Steel Rolling Mills.

SEATTLE, 250 tons, James Madison School, to Pacific Coast Steel Co.

SEATTLE, 150 tons, store, Sixth Avenue and Spring Street, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PROVIDENCE, R. I., 1700 tons, Washington Bridge; Merritt-Chapman & Scott Corporation, general contractor.

EVANSTON, ILL., tonnage not stated, track elevation work for Chicago Rapid Transit Co.

CHICAGO, 1000 tons, five junior high schools.

SACRAMENTO, CAL., 147 tons, bridge over Santa Clara River at Saugus; bids Aug. 1.

SACRAMENTO, 400 tons, paving in Ventura County; Jans & Bressi, Los Angeles, low bidders.

VENTURA, CAL., 118 tons, Bardsdale bridge; bids July 24.

LOS ANGELES, 250 tons, apartment building at 2100 North Vermont Street; bids being taken.

LOS ANGELES, 589 tons, Big Dalton Dam; bids July 30.

SEATTLE, 147 tons, Second Avenue viaduct extension; bids July 27.

ELLENSBURG, WASH., 105 tons, South branch canal, Kittitas division of Yakima project; bids Aug. 7.

SAN FRANCISCO, 200 tons, garage, Jones and Turk Streets; bids being taken.

SAN FRANCISCO, 200 tons, school, Fulton and Masonic Avenues; bids being taken.

RAILROAD EQUIPMENT

EXPORT business continues to feature the railroad equipment market. A Brazilian road has placed 1000 box cars with United States builders while an Argentine carrier is soon to make inquiry in this country for about 60 locomotives. The Chicago, Rock Island & Pacific has purchased 250 gondola car bodies. Details of the week's business follow:

Chicago, Rock Island & Pacific has placed 250 gondola car bodies and repairs to trucks with Ryan Car Co. This road is also inquiring for 10 air-dump cars.

American Cyanamid Co. has placed 20 hopper cars with General American Car Co.

Argentine State Railways contemplate buying about 60 locomotives.

Central of Vermont is reported to have placed eight locomotives with American Locomotive Co.

Paulista Railway, Brazil, is reported to have placed orders for 1000 box cars with American builders.

Union Railroad is inquiring for two locomotive tenders.

Barrett Co. has ordered 16 tank cars from General American Tank Car Corporation.

Cities Service Co. has ordered four tank cars from General American Tank Car Corporation.

Chicago, St. Paul, Minneapolis & Omaha has made inquiry for four gas-electric rail motor cars.

Illinois Central has bought two air-dump cars from Western Wheeled Scraper Co.

Northern Pacific is inquiring for one steel business car.

Bethlehem Rolling 36-In. Wide-Flange Beams

The Bethlehem Steel Co., which recently added to its line of wide-flange structural shapes a series of 33-in. beams and girders, now announces the rolling within the past few weeks of a series of 36-in. wide-flange beams and girders at its Lackawanna plant, Lackwanna, N. Y. These new sections are the deepest and heaviest beam sections produced in the United States.

The 36-in. I-beams are rolled in weights of 147, 155, 164 and 173 lb. per ft., and the girder beams are rolled in weights of 231, 240, 250 and 260 lb. per ft.

The American Institute of Steel Construction, Inc., has established a Northwestern district office in Milwaukee at 529 Wells Building, 120 East Wisconsin Avenue, in charge of C. Curtis Tracy, formerly structural engineer with Densmore, LeClear & Robbins, Boston. The district embraces the States of Wisconsin, Minnesota, North and South Dakota, Montana and Wyoming.

PERSONAL

FRANK D. CARNEY of Carney & Lindemuth, 40 Wall Street, New York, consulting engineers, sailed July 14 on the *Minnewaska*, for a three months' tour of Europe to visit British and Continental steel plants. His permanent address will be in care of the American Express Co., London.

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WALTER H. WIEWEL, for the past three years New York district sales manager for the Standard Seamless Tube Co., Pittsburgh, has been appointed New York district manager of steel sales for the Timken Roller Bearing Co., Canton, Ohio, with headquarters at 16 West Sixtieth Street. His previous experience in the steel business includes four years in the Cleveland office of the Cambria Steel Co., Johnstown, Pa., and 11 years with the United Alloy Steel Corporation, Canton.

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J. E. HALL, associated for 16 years with Hill, Clark & Co., Boston machinery dealers, and with their successors, Stedfast, Roulston & Co., has joined the machine tool sales department of the Triplex Machine Tool Co., 50 Church Street, New York.

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J. R. LOVEJOY, George F. Morrison and B. G. Tremaine, directors and prominent in the management of the General Electric Co., Schenectady, N. Y., were elected honorary vice-presidents of the company, a newly created position, at a recent meeting of the board. Mr. Lovejoy has been associated with the company for 42 years, a vice-president since 1907 and most recently has served as president of the General Electric Employees Securities Corporation. Mr. Morrison, a vice-president since 1916, has been identified with the company for 45 years and has been particularly active in the development, manufacture and sale of incandescent lamps. Mr. Tremaine was one of the organizers of the National Lamp Division of the company and has long been associated with its incandescent lamp business. T. W. Frech, manager of the incandescent lamp department, has been appointed vice-president in charge of the incandescent lamp department. He has been identified with the company since 1901 and manager of the lamp department since 1927. Dr. Willis R. Whitney, who has been director of the General Electric research laboratory since 1900, has also been made a vice-president and will continue as director of research.

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SAMUEL C. REBMAN has been appointed district sales manager in the anthracite district of Pennsylvania for the Sweet's Steel Co., Williamsport, Pa., and will have headquarters at 508 Miners Bank Building, Wilkes-Barre. He began his career in 1890 in the employ of the Mahoning Rolling Mill, Youngstown, and in 1904 became manager of sales of the Danville Structural Tubing Co., Danville, Pa. When the company was purchased by Charles M. Schwab in 1915, Mr. Rebman became vice-president and treasurer, continuing in that position until 1926. For the last two years he has been district sales manager for Steel & Tubes, Inc., New York.

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DONALD M. MACDONALD, formerly associated with the engineering department of Stone & Webster, Inc., Boston, has been placed in charge of an office which has been opened at 101 Tremont Street, Boston, by the Pittsburgh Testing Laboratory, Pittsburgh.

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GRANT B. SHIPLEY, chairman and president of the American Mond Nickel Co., Century Building, Pittsburgh, United States branch of the Mond Nickel Co., Ltd., London, England, has been elected a director in the parent company.

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R. W. HOYT, formerly of Alfred Gardner & Co., Chicago, has joined the sales organization of the Foote Brothers Gear & Machine Co., Chicago, and will cover the territory on the south side of Chicago extending from Roosevelt Road to Sixty-third Street.

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W. C. GOODWIN, formerly section engineer of the control engineering department, has been appointed manager of the renewal parts engineering department of the Westinghouse Electric & Mfg. Co. In August, 1926, Mr. Goodwin went to England as liaison engineer for the Westinghouse company with European companies with which the Westinghouse company has relations. He represented the Westinghouse engineering department in Europe for almost two years, spending time in England, France, Italy, Norway, Germany and Czechoslovakia. Mr. Goodwin is a member of the American Institute of Electrical Engineers, a former secretary of the Pittsburgh section of that organization, and is also a member of the Engineering Society of Western Pennsylvania.

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E. H. GERBERDING has been made assistant treasurer of the Westinghouse Electric & Mfg. Co., East Pittsburgh. He began work in the company's treasury department 28 years ago, and has been continuously employed in the same department since that time.

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DR. EDWARD DEAN ADAMS, consulting engineer, New York, who was chairman of the committee on war memorials to American Engineers and represented the Engineering Foundation at the dedication of the library and engineers' memorial carillon and clock at Louvain, Belgium, July 4, received an honorary doctorate from the University of Louvain and was made commander of the Order of the Crown by the Belgian Government.

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BLAKE R. VANLEER, assistant professor of mechanical engineering at the University of California, Berkeley, has been appointed assistant secretary of the American Engineering Council, succeeding A. C. Oliphant, who has resigned.

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LOUIS SCHLESINGER, president Bradley Wash-Fountain Co., 2203 Michigan Street, Milwaukee, manufacturer of sanitary equipment for industrial and institutional purposes, has disposed of his interest in that company to H. A. Mullett and associates and is retiring. Mr. Mullett has been elected president; G. W. Grossenbach, vice-president; E. S. Wetherell, secretary, and R. H. Weins, treasurer.

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PAUL M. TYLER, identified with the Metals Section of the United States Tariff Commission, has resigned and has become associated with the economics branch of the Bureau of Mines, Department of Commerce.

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LEYS A. FRANCE, Cleveland, has been appointed assistant trade commissioner at Montreal.

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DR. R. H. PATCH, assistant to the president of E. F. Houghton & Co., Philadelphia, was elected chairman of the Philadelphia chapter of the American Society for Steel Treating at the annual meeting held recently at the plant of the Edward G. Budd Mfg. Co. H. E. Allen, metallurgist Henry Disston & Sons Co., Inc., was named vice-chairman, and Arthur W. F. Green, sales metallurgist John Illingworth Steel Co., secretary-treasurer. The following executive committee was chosen: Norman C. Einwechter, president Einwechter & Wyeth, for two years; Dr. H. C. Boynton, metallurgist John A. Roebling's Sons Co., Trenton, N. J., for two years; C. C. Willitts, district sales manager Central Alloy Steel Corporation, for one year; M. M. Kennedy, metallurgist Philadelphia Navy Yard, for one year, and J. R. Adams, superintendent of research and special problems for Midvale Co., for two years.

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SILAS M. HAIGHT, recently engineer for the Highway Products & Mfg. Co., Elmira, N. Y., has been appointed manager of the research department of the Sweet's Steel Co., Williamsport, Pa. He was graduated in civil engineering from Lafayette College, Easton, Pa., in 1908 and has been engaged in varied engineering practice.

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JOHN D. TINSMAN, formerly superintendent of maintenance at Steubenville, Ohio, for the Wheeling Steel Corporation, has been appointed to a

similar position for the Republic Iron & Steel Co., serving in the Youngstown district, excluding the Trumbull works.

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J. W. CLIFF, for the last five years shop superintendent of the Merco Nordstrom Valve Co., San Francisco, has been appointed production manager of the MacGregor Valve Co., St. Louis. His past engineering experience includes service with the Power Accounting Co., the Hyatt Roller Bearing Co., the Wright-Martin Aircraft Co. and the Weston Electrical Instrument Co.

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DOUGLAS E. PRICE, recently in the contracting department of the Koppers Construction Co., Pittsburgh, has been appointed contract manager for the American Tar Products Co.

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JOHN F. WILSON, auditor at the South works, Illinois Steel Co., retired from active duty on July 1, after 55 years of continuous service. He started to work for the Joliet Iron & Steel Co., March 15, 1873, remaining with this company and its successor, which was finally taken over by the Illinois Steel Co. He went to the South works as local auditor in 1900 and was one of two employees at the South works who were awarded the Gary medal for 50 years or more of service. H. S. Sylvester succeeds Mr. Wilson.

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J. FRED MOWAT has been appointed chief engineer of the Illinois Steel Co.'s Joliet plant. He was graduated from Cornell University in 1904 and shortly after going with the Illinois company he was made steam engineer. In 1914 he was made master mechanic of the blast furnaces and in 1918 appointed assistant chief engineer.

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P. C. SPRAGUE, for ten years traffic manager of the M. A. Hanna Co., Cleveland, has been appointed sales manager of the bituminous coal department of that company.

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R. E. J. SUMMERS, chief contracting engineer of the H. K. Ferguson Co., Cleveland, engineer and builder, has been made a vice-president of that company in charge of contract work.

Orders received by the General Electric Co. for the three months ended June 30 amounted to $90,431,957, compared with $78,105,247 for the corresponding quarter of 1927, an increase of 16 per cent, President Gerard Swope has announced. For the six months ended June 30, orders received amounted to $170,357,797, compared with $155,655,828 last year, an increase of 9 per cent.

Sheffield Steel Corporation has given an order to Westinghouse Electric & Mfg. Co. for electrical equipment for a steel mill to be built in Kansas City with monthly capacity of 10,000 tons.

British Trade Is Unsatisfactory

Some Lighter Lines Doing Fairly Well, but Heavier Steel Products and Pig Iron Are in Slow Demand

LONDON, ENGLAND, July 6.—The position of the iron and steel trade generally continues very unsatisfactory. This is particularly true of the pig iron industry and of the heavy steel branches, there being a fair amount of activity in a number of the lighter lines.

In pig iron, the chief weakness lies in large stocks and poor demand, and although the production in various parts of the country has been subjected to drastic curtailment, Cleveland producers of pig iron are perhaps better off than those in other districts, as their stocks are small; they are busy on current contracts and their selling prices are governed by their own "ring," but they, too, are beginning to feel the necessity of looking for new business to replace the old. The whole iron and steel market is under the influence of holidays. Last week Tyne-side was on vacation. Next week the Glasgow Fair begins, to be followed later by the Black Country wakes and Stockton race week, so that August will be over before there can be any return to normal conditions.

In the steel trade, the heavy industries are in the worst plight. A few more ships are coming on the stocks, but the tonnage of steel therefrom is but a drop in the ocean. Steel makers have made repeated efforts to obtain government assistance, but without success, and the trade must be left to work out its own salvation. Drastic reduction in costs and revisions in methods of disposal, etc., are needed; that is why there has been so much talk of a central selling agency, but the most favorably placed works, both economically and geographically, are not disposed to assist their less fortunate competitors, so that for the time being there is little prospect of such a plan being consummated.

Export buying of heavy materials is at low ebb. The closing of the Tata Iron & Steel Co.'s works in India, because of labor disturbances, has released a few orders for this country, and Japan is trying to place some contracts here, while locomotive builders have some useful South African contracts to execute; but apart from these the demand for export is exceptionally meager. In the home branches, engineering and construction departments keep some plants busy.

Trading in tin plate has continued good, although the confidence of consumers has been shaken by the fall in tin prices during the last month or two, but makers are very busy and the operations at the mills are running at well over 90 per cent, and some plants are assured of full capacity working for a number of weeks or months.

Orders for Fabricated Structural Steel Fall Off

WASHINGTON, July 17.—Tonnage of new orders reported by the principal manufacturers of fabricated structural steel for June are given by the Department of Commerce as 233,775 tons, representing 81 per cent of capacity. This is the total from 196 firms whose capacity is given at 289,430 tons. It compares with orders in May aggregating 251,488 tons, or 83 per cent of the 304,950 tons capacity of the 223 firms then reporting.

Computed tonnage in June is given as 303,750 tons, a reduction of about 2½ per cent from the 311,250 tons for May. Except for May and for July, 1927, however, this computed tonnage is the largest for several years. In July, last year, it was 345,000 tons, while in June it was 228,750 tons.

Shipments of the 229 identical firms carried in the computed tonnage lists were given as 270,000 tons in June, representing 72 per cent of capacity. This is the largest total since last September, when the same figure was reported. In August, last year, the total was 285,000 tons. That is the only case exceeding last month's total in several years.

For the half year, computed tonnage of new orders is given as 1,586,250, against 1,395,000 a year ago. This represents an increase of about 14 per cent. Similarly, shipments in the six months are computed at 1,455,500 tons this year against 1,342,500 tons last year, representing a gain of about 8½ per cent.

Standard Sample of Fluorspar

The Bureau of Standards at Washington has prepared a standard analyzed sample of fluorspar, which contains 94.9 per cent calcium fluoride, 1.9 per cent silica, 1.0 per cent carbon dioxide, 0.14 per cent sulphur, 0.34 per cent zinc and 0.25 per cent lead.

The price of this sample, which is No. 79 in the series, is $2.50 for 60 grams. The sample may be paid for in advance with the order or be sent parcel post C.O.D. in the United States and its possessions. A complete list of standard samples and analyses is given in Bureau of Standards supplement to circular No. 25, which can be obtained upon application to the bureau.

OBITUARY

RUFUS C. PHILLIPS, secretary American Rolling Mill Co., Middletown, Ohio, and a brother-in-law of George M. Verity, president of that company, died in a hospital at that city on July 11, aged 63 years. He was born at Georgetown, Ohio, and early in life became acquainted with Mr. Verity, joining him in 1891 in the

RUFUS C. PHILLIPS

organization of a steel company in Cincinnati which developed into the present Rolling Mill Co. At that time he was placed in charge of the sales department, continuing in that work until illness forced him to withdraw from active interest. He was prominent in civic, educational and religious affairs at Middletown, having been the founder of the Y. M. C. A. in that city.

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CHARLES A. CHEVRAUX, secretary and general manager of the Massillon Rivet & Mfg. Co., Massillon, Ohio, successor to the Canton Bolt Co., died on July 6, as a result of injuries sustained a few days before while inspecting machinery at the company's plant. He was born at Canton, Ohio, 51 years ago and was secretary of the Cleveland-Canton Spring Co. for 24 years. He then went to Richmond, Ind., as production manager of the Jenkins Vulcan Spring Co., but returned to Ohio as secretary of the Beans Spring Co., Massillon.

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MAJ. JOSEPH A. STEINMETZ, founder and senior member of Janney, Steinmetz & Co., Philadelphia, died at his home in that city on July 11, aged 58 years. He attended Lehigh University, Bethlehem, Pa., and soon afterward became associated with Professor Langley in the development of airplane engines. Since that time he had been constantly active in aviation work, particularly during the World War, when he was the inventor of many anti-aircraft devices. Mr. Steinmetz had been active in Janney, Steinmetz & Co. until his partial retirement six months ago on account of ill health. He was a member of the American Society of Automotive Engineers, the Franklin Institute, the American Electrochemical Society and the Engineers Club of Philadelphia.

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ALEXANDER R. PEACOCK, one of the partners of Andrew Carnegie in the Carnegie Steel Co., Ltd., and, prior to the formation of the United States Steel Corporation, first vice-president and general sales manager of the Carnegie company, died on July 12 at St. Vincent's Hospital, New York, aged 66 years. Mr. Peacock and Mr. Carnegie were born in the same town, Dunfermline, Scotland, and the former began his career in the United States in the linen department of a Pittsburgh department store, where his work came to Mr. Carnegie's attention. He entered the credit department of the Homestead works of the Carnegie company but later was transferred to the sales department, subsequently becoming general sales agent. At the time of the changes in the management of the Carnegie Steel Co., Ltd., attending the election of Charles M. Schwab as president, April 1, 1897, Mr. Peacock was made first vice-president and placed in general charge of the selling department. He continued in this position after the reorganization of the company at the time of the Frick-Carnegie suit in 1899. At that time the official records showed that he was the holder of 2653 shares of stock and of $2,707,000 in bonds of the new company. He retired from active participation in the steel industry at the formation of the Steel Corporation and had resided in recent years at the Hotel Broztell in New York.

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FREDERICK WINTERS GRIFFITH, one of the founders and president, treasurer and a director of the Garlock Packing Co., Palmyra, N. Y., died July 11, at his home in Pasadena, Cal. He was born at Phelps, N. Y., in 1858, and was graduated from Hamilton College. His entire business career had been spent in the mechanical packing industry.

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MICHAEL J. GOOLEY, senior member of Gooley & Edlund, Inc., Cortland, N. Y., manufacturer of jigs, fixtures and other machine shop products, was killed in an automobile accident near his home in Syracuse, N. Y., on July 14. He was 63 years of age and had been prominent in manufacturing circles of Syracuse and Cortland.

FRANK H. HAYES, president Hayes Pump & Machinery Co., Cambridge, Mass., died July 14 at the Cambridge Hospital. He was 79 years old and had been in the pump and machinery business 45 years, first with the Dean Steam Pump Co. He organized his own company in 1900.

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THOMAS F. FLINN, engineer, for 37 years identified with Henry R. Worthington, now the Worthington Pump & Machinery Corporation, died July 9 at his home in Brooklyn, aged 87 years. He was born in Ireland and

THOMAS F. FLINN

came to this country just prior to the outbreak of the Civil War, in which he served, rising to the rank of lieutenant in the Union Army. In later years he had been interested in the development of motor cars, his experiments having resulted in the invention of a steam engine for automobile use. At the outbreak of the World War he offered his services to the Government and did experimental work in the development of aviation motors. He was a life member in the American Society of Mechanical Engineers.

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EMIL EISELT, works manager for the Standard Steel Car Co., Hammond, Ind., died July 12 of pneumonia, aged 47 years.

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JUSTIN D. CROSBY, head of the J. D. Crosby Co., Pawtucket, R. I., maker of cold rolled steel, died July 11 at the Memorial Hospital in that city, of pneumonia. He was born at Worcester, Mass., 66 years ago, where he was employed by the Washburn Woven Wire Co. and the American Steel & Wire Co. He established his Pawtucket business in 1910.

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WILLIAM PESTELL, vice-president of the Riley Stoker Corporation, Worcester, Mass., died on July 10. He was born at Rutland, England, 56 years ago. He became a member of the Riley organization in 1914 and in recent years was manager of sales.

Machinery Markets and News of the Works

Slight Falling Off in Orders

Sizable Sales Include 11 Tools for Commonwealth Edison Co.—List of Tools for Hammond, Ind., Power Plant Expected

DEMAND for machine tools was slightly less during the past seven days than the average over the five or six preceding weeks. However, allowing for the season, the volume of orders is good, and is considerably higher than in the corresponding period last year. In the Cincinnati district operations are being well sustained, although the capacity of some machine tool plants is much more fully engaged than that of others. Fresh inquiry from scattered sources is of fair total.

The General Electric Co. and the Wright Aeronautical Corporation continue in the market and orders are still being received from agricultural implement makers. Except for the placing of an order for eight production lathes, demand from the Detroit territory has been quiet. Fresh inquiries from railroads in the Chicago district show more promise than for some time.

A list of tools is being prepared by the State Line Generating Co., Hammond, Ind., for a new power plant. Boston will close bids July 19 on six machine tools for the Hyde Park district school and it is expected that at least part of the first list for the same school will be closed within a week. Four large machines, including a ⅝ x 102-in. gate shear, are to be ordered by A. M. Castle & Co., Chicago, for their San Francisco warehouse.

Sizable sales include 11 machine tools for the Fisk Street station of the Commonwealth Edison Co., Chicago. The Bethlehem Steel Co. purchased two large turret lathes and may buy a few other tools. A dealer in the Chicago district received orders for 11 power presses of small and medium size during the past week.

New York

NEW YORK, July 17.—Machine tool business in the first half of July ran considerably ahead of that in the corresponding period last year, but was slightly less than last month's average sales. Those who have participated in orders being distributed by the General Electric Co. and the Wright Aeronautical Corporation—and these orders are coming in every day—have fared somewhat better than is usually to be expected at this season of the year. Inquiries are in fairly good number, and machine tool sellers have plenty of prospects upon which to work, but vacation absences of executives of manufacturing companies tend in some cases to delay purchases. The Bethlehem Steel Co. recently purchased two large turret lathes and may buy a few other tools.

Sales by Niles-Bement-Pond Co. in the week included a 72-in. duplex-controlled horizontal boring machine, 27-in. Time-Saver lathe, 20-in. Niles-Acme shaper and a number of other tools. Pratt & Whitney division sold four 5-in. production hand milling machines, three No. 2 jig borers, three 14-in. vertical surface grinders and two Sigourney drilling machines.

Bids will be asked within 60 days by Western Electric Co., 195 Broadway, New York, for a new five-story plant at Emeryville, Cal., to cost close to $500,000 with machinery. Engineering department of company is in charge. Pacific Coast offices are at 680 Folsom Street, San Francisco.

George A. Bagge & Sons, 157 East Forty-fourth Street, New York, architects, have asked bids on general contract for a two-story automobile service, repair and garage building to cost $150,000 with equipment.

American Radiator Co., 40 West Fortieth Street, New York, has purchased property at Radburn, a new industrial site near Paterson, N. J., and plans construction of factory branch and distributing plant to cost close to $100,000 with equipment.

Consolidated Copper Mines Corporation, 120 Broadway, New York, has approved plans for additional buildings at properties in Middle West, including one-story machine shop, steel head frame, hoist house, as well as steel storage bins with capacity of 5000 tons, and other expansion, to cost more than $90,000. J. B. Haffner is general manager.

Ovens, power equipment, conveying and other machinery and apparatus will be installed in two-story plant to be erected by Dugan Brothers, Inc., 288 South Fifth Street, Brooklyn, at Queensville, N. Y., to cost upward of $350,000 with equipment. Henry Holder, 242 Franklin Avenue, is architect.

Beacon Oil Co., Inc., 320 Freeman Street, Brooklyn, has plans for new oil storage and distributing plant to cost close to $150,000, for which bids will be asked on general contract in about a month. Headquarters are at Everett, Mass. B. F. Fallon, 26 Auckland Street, Boston, is architect.

Shampan & Shampan, 188 Montague Street, Brooklyn, architects, have taken out a permit for a two-story automobile service, repair and garage building, 100 x 278 ft., to cost close to $180,000 with equipment.

Yale Electric Corporation, 60 Tillary Street, Brooklyn, manufacturer of flashlights, flashlight batteries and kindred products, has completed erection of new plant at Jersey City, six-stories, totaling 40,000 sq. ft. floor space, and will concentrate production at this point in the future, discontinuing operations at Brooklyn works, which is being removed to the new location.

American Can Co., 120 Broadway, New York, is said to have plans for a new seven-story plant unit, 100 x 200 ft., at Jersey City, N. J., to cost close to $300,000 with equipment. A. B. Heiser is company architect.

Charles Freshman Co., 240 West Fortieth Street, New York, manufacturer of radio equipment, has disposed of additional stock, totaling about $1,000,000, and will use a portion of fund in developing increased output for all-electric radio equipment and sets. Factory is at 470 East 133rd Street.

Board of Trustees, Pratt Institute, 257 Ryerson Street, Brooklyn, has awarded general contract to Edward Corning Co., 145 East Forty-fifth Street, New York, for a four-story mechanical and technology building, 60 x 180 ft., to cost about $200,000 with equipment. John M. Howells, 156 East Forty-sixth Street, New York, is architect.

Rainbow Light, Inc., Thirteenth Street, Long Island City, operating subsidiary of Rainbow Luminous Products, Inc., same address, manufacturer of electric tube lighting equipment and devices, is planning an expansion program at branch

The Crane Market

LITTLE new business has been placed, but the trade is still actively interested in pending business, both domestic and export. Considerable crane equipment is expected to be needed for a power plant at Deepwater, N. J., on which Stevens & Wood, Inc., New York, is engineer. McClellan & Junkersfield, New York, are asking for bids on a 100-ton electric overhead crane for a power plant in California and early action is expected on a 60-ton overhead crane for a power house of the Phoenix Utility Co., New York. The Pennsylvania Railroad is in the market for four 10-ton electric overhead cranes, two for Kearny, N. J., and two for Philadelphia.

In the Chicago district Sargent & Lundy, consulting engineers, Chicago, will purchase a 20-ton power house crane for delivery at San Benita, Tex. A. M. Castle & Co., Chicago, are also in the market for two electric traveling cranes for their San Francisco plant, one of 5 and one of 10 tons' capacity.

Among recent purchases are:

W. R. Grace & Co., New York, one 5 and one 15-ton hand power crane with 28 ft. 8 in. span, for export to Peru, from Box Crane & Hoist Corporation.

Dollar Bay Steel Co., Dollar Bay, Mich., 22-ton, 8-wheel steam operated locomotive crane, from Orton Crane & Shovel Co.

Link-Belt Co., Chicago, 5-ton, 3-motor electric crane, from Manning, Maxwell & Moore, Inc.

Missouri Pacific Railroad, 20-ton gantry crane for use at Wichita, Kan., from Whiting Corporation.

plant at Detroit, with installation of additional facilities for production of luminous tubes and kindred specialties.

John Waldron Co., 30 East Forty-second Street, New York, manufacturer of paper mill machinery, has awarded general contract to H. K. Ferguson Co., Cleveland, for one-story addition to plant at Highland Park, N. J., to cost about $45,000 with equipment.

Board of Education, Roselle Park, N. J., is considering installation of manual training equipment in three-story and basement high school to cost $480,000, for which bids are being asked on general contract. Fred A. Elsasser, Fall Building, Union, N. J., is architect. J. W. Graves is clerk.

Wickham Co., Church Street, Matawan, N. J., manufacturer of piano plates and other castings, is arranging for immediate removal of local plant to its branch works at Springfield, Ohio, where production will be concentrated. Matawan plant will be sold.

Board of City Commissioners, City Hall, Newark, will soon begin work on a new hangar, 120 x 120 ft., with repair and reconditioning shop, at municipal airport, Port Newark, to cost close to $70,000 with equipment. City engineering department is in charge.

United Color & Pigment Co., Evergreen Avenue, Newark, will soon begin superstructure for a one-story and basement addition, 70 x 121 ft., for which general contract recently was let to Enstice Brothers, 111 Academy Street, to cost about $40,000 with equipment.

Howard Buschman, Newark, has leased property at 49-51 East Bigelow Street, for a machine shop.

City Commission, Asbury Park, N. J., has authorized plans for a municipal incineration plant, cost not to exceed $155,000, and will take bids soon.

Ensign-Reynolds, Inc., 408 East 111th Street, New York, has been formed to manufacture high pressure gas burners for industrial applications, inspirators, gas boosters and air blowers. Company has shop equipped and does not contemplate additional building or letting of manufacturing contracts.

W. L. Clayton, Inc., 901 Bergen Avenue, Jersey City, has been organized to manufacture heating specialties. Products are being manufactured by contract, but company will let additional contracts in near future.

Carrier Engineering Corporation, 750 Frelinghuysen Avenue, Newark, N. J., manufacturer of air conditioning, drying, processing and refrigerating equipment, has purchased four-story factory and office building a 850 Frelinghuysen Avenue, formerly occupied by Edison Lamp Works Division, General Electric Co. Company will remove to new quarters before Aug. 1.

Allen Air Appliance Co., Inc., 452 Lexington Avenue, New York, has been organized to manufacture single and multistage centrifugal blowers and exhausters and portable and stationary vacuum sweeping systems of heavy-duty type. Company has taken over plant, including foundry, pattern and machine shop, formerly occupied by Northern New York Foundry & Machine Co., Glens Falls, N.Y. F. C. Allen, Jr., founder and former president of Allen & Billmyre Co., Inc., New York, is president.

Philadelphia

PHILADELPHIA, July 16.—Philadelphia Garage Co., Carlisle and Cherry Streets, Philadelphia, has acquired six-story building, 50 x 180 ft., on North Broad Street, formerly occupied by Cadillac Motor Car Co., and will remodel for a new service, repair and garage unit, to be operated in conjunction with present garage, which is directly in rear of acquired property. Work will cost upward of $75,000.

Swain-Hickman Co., 3519 Lancaster Avenue, Philadelphia, manufacturer of automobile parts, has asked bids on general contract for an addition to cost more than $23,000 with equipment.

William Steele & Sons Co., 219 North Broad Street, Philadelphia, engineer and contractor, has plans for a five-story automobile service, repair and garage building, 90 x 155 ft., with capacity of about 500 cars, to cost $160,000.

Sun Oil Co., Finance Building, Philadelphia, is said to be planning early rebuilding of portion of storage and distributing plant at Syracuse, N. Y., recently destroyed by fire, with loss close to $100,000 including equipment.

Victor Talking Machine Co., Camden, N. J., has acquired property at Hollywood, Cal., as site for new Pacific Coast plant for development and manufacture of talking machine apparatus in connection with motion pictures. A record-pressing unit will also be built. Entire project will cost about $250,000 with equipment. E. R. Fenimore Johnson is executive vice-president.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, is considering construction of a new oil refinery on Neches River at Atreco, Tex., where a loading station is now being operated, to cost more than $12,000,000. Project will be carried out in conjunction with new 10-in. pipe line to be built by Atlantic Pipe Line Co., a subsidiary, from Midland, Tex., to Atreco, about 500 miles, for which surveys will be made at once. It will be provided with 12 booster stations and have capacity of about 30,000 bbl. of crude oil per day.

George D. Ellis & Sons, Inc., 309 North Third Street, Philadelphia, manufacturer of tin cans and metal containers, has acquired three and four-story building, 69 x 97 ft., at 220-24 Wood Street, for expansion.

Marwick Non-Skid Chain Mfg. Co., Falls, Pa., recently formed by Fred Marwick and James Bailey, both of Falls, plans early operation of local plant for manufacture of tire chains.

Hajoca Corporation, 1136 Ridge Avenue, Philadelphia, manufacturer of plumbing equipment and supplies, has acquired former foundry of Hazleton Iron Works, Hazleton, Pa., and will use site for new factory branch and distributing plant. Existing building will be razed and two-story structure, 50 x 190 ft., erected.

Sandusky Cement Co., Engineers' Building, Cleveland, has purchased tract of 50 acres in Hellam Township, vicinity of Hellam, Pa., adjoining tract acquired several months ago, and is reported considering a branch mill and distributing plant in this section.

Wilmington Gas Co., Wilmington, Del., has plans for a new equipment storage and distributing plant, 102 x 182 ft., to include shops for repair of meters, gas appliances, etc., and machine and repair shop for motor trucks. Cost is estimated at close to $80,000 with equipment.

Board of Education, Tyrone, Pa., plans installation of manual training equipment in new two-story junior and senior high school to cost $160,000, for which bids will soon be asked on general contract. Lawrie, Green & Co., Third and Forster Streets, Harrisburg, Pa., are architects.

Ornamental Iron Works, Mount Carmel, Pa., recently organized by R. J. Best and L. W. Brandlinger, both of Mount Carmel, has awarded general contract to Truscon Co., Youngstown, for a one-story plant to cost close to $27,000 with equipment.

Horace T. Potts & Co., Philadelphia, have been appointed sales agents in eastern Pennsylvania, southern New Jersey and Delaware for patent non-splitting nail manufactured by Stronach Nail Co., Pittsburgh.

New England

BOSTON, July 16.—The city of Boston will close bids July 19 on an automatic screw machine, three milling machines, a shaper and a surface grinder. This completes the equipment wanted for the Hyde Park district school. It is expected that at least a part of the first list on which bids were submitted will be closed within a week. Aside from this business the local machine tool market is inactive. There is also a noticeable lack of new inquiries. Dealers have a large number of what are considered active prospects, but there is little indication of their closing within the immediate future. Small tools continue in good demand with deferred deliveries on certain makes.

Griffin Wheel Co., 40 Gerrish Avenue, Chelsea, Mass., is making plans for new crane runways.

Androscoggin Foundry, 37 Washington Street, Auburn, Me., is building an addition. L. MacFadden is superintendent. Plans are private.

Funk & Wilcox, 26 Pemberton Square, Boston, architects, have completed plans for a one-story, 100 x 150 ft. ice-making plant for Ice Utilities, Inc., Lowell Street, Fall River, Mass.

C. T. Ashley, mayor, New Bedford, Mass., has awarded a general contract for a city vocational school to contain a machine shop. C. Hammond & Co., 179 North Water Street, New Bedford, are architects.

Plans are nearing completion for a two-story addition, 33 x 40 ft., for Beaudette Mfg. Co., Crescent Avenue, Chelsea, Mass., maker of loud speakers and other radio equipment.

Robertson Motor Co., School Street, Taunton, Mass., is considering a new one-story service, repair and garage building at Hyannis, Mass., to cost upward of $75,000 with equipment.

LeBoeuf Fountain Pen Co., Inc., Springfield, Mass., has leased space in building at 4 Birnie Avenue, formerly occupied by Perkins Machine & Gear Co., totaling 5700 sq. ft., for new plant for production of desk sets, fountain pens and kindred products. Present works at 33 and 49 Arch Street will be removed to new location early in August.

Board of Education, 169 Church Street, New Haven, Conn., has authorized installation of metal-working and other vocational shops in three-story addition to be erected at Fair Haven junior high school, for which bids are being asked on general contract until July 26. Brown & VonBeren, New Haven, are architects.

Automotive Standards, Inc., Newark, N. J., which recently established local plant for manufacture of automobile equipment on waterfront site and with main offices at 60 Park Place, Newark, has purchased Hartford Battery Mfg. Co., Hartford, Conn., and will operate as a unit of its business.

Winsted Insulated Wire Co., Winsted, Conn., will install considerable additional machinery for increased output.

Compressed Steel Shafting Co., 1587 Hyde Park Avenue, Hyde Park, Boston, has awarded general contract to Topham & Bates, 1209 Hyde Park Avenue, for a one-story addition, to cost more than $30,000 with equipment.

City Water Department, Springfield, Mass., E. Lochridge, chief engineer, is completing plans for new power house on site of reservoir, Little River, with capacity of 23,000 kw., to cost about $1,000,000. Station will be leased to Turners Falls Power & Electric Co., Turners Falls, Mass., which will build a transmission line for connection with its system.

Horton Mfg. Co., Bristol, Conn., manufacturer steel fishing rods and other fishing tackle, has awarded general contract to Torrington Building Co., Torrington, Conn., for an addition.

Plant and equipment of Stanford Steel Corporation, Buckingham Avenue, Milford, Conn., will be sold at public auction July 23. Property consists of one-story brick and steel manufacturing building containing 12,000 sq. ft. of floor space and other frame buildings with miscellaneous equipment. James B. Kelly Co., 42 Church Street, New Haven, Conn., is auctioneer.

Cincinnati

CINCINNATI, July 16.—Machine tool orders have fallen off slightly the past week, although the volume for the first half of July mounted to a surprisingly satisfactory level. Despite the summer season, operations in local shops are being well sustained and business on hand is sufficient to insure the continuation of production on the current scale for several weeks. The situation is somewhat spotty, however, some plants getting a proportionately large share of the business and others badly in need of orders, but the general average is good for this time of year.

An automobile company has bought eight high production lathes, but aside from this single transaction, purchases in the Detroit district have been meager. Local builders have continued to receive orders from agricultural implement makers. A sale of two engine lathes to a company in Russia is noted. The Southern Pacific has contracted for a 4000-lb. double frame steam hammer and the Manistee Iron Works, Manistee, Mich., has bought a 72-in. duplex control borer.

Board of Education, Oxford, Ohio is considering installation of manual training equipment in new junior and senior high school to cost about $165,000, for which plans will be drawn by Ronen & Ingleson, 1614 North High Street, Columbus, Ohio, architects.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until July 23 for ammeters, voltmeters, etc., circular 35.

A substantial interest in Cincinnati Bell Crank Co., North Oakley, Cincinnati, manufacturer of automobile parts and equipment, has been acquired by Ludwig Kemper, 2996 Brighton Road, Cleveland, connected with local steel companies, and associates. Plans are under way for reorganization of company with expansion program.

Board of Putnam County Commissioners, Cookeville, Tenn., is planning extensions and improvements in hydroelectric power plant at Burgess Falls, to cost $100,000 with equipment. Special election has been called Aug. 4 to approve bonds.

Four Hundred Seventy-Six Tire Co., 114 North St. Clair Street, Dayton, Ohio, is having plans drawn for a two-story service and repair works, 50 x 100 ft., to cost close to $65,000 with equipment.

Radnor Water Co., Inc., Nashville, Tenn., plans installation of pumping machinery and other power equipment in waterworks station for service in Radnor Heights and Flat Rock sections, to cost about $200,000.

Portsmouth Auto Parts & Wrecking Co., 1121 Findlay Street, Portsmouth, Ohio, has plans for new one-story factory, 35 x 80 ft., to cost close to $37,000 with equipment. Bids will soon be asked on general contract.

Stoll Oil Refining Co., Louisville, is planning an addition to oil storage and distributing plant at Elizabethtown, Ky., to cost more than $45,000 with equipment. W. A. Stoll is treasurer.

Board of Education, Bowling Green, Ky., is considering installation of manual training equipment in a new junior high school to cost more than $200,000, for which plans will be drawn by Marr & Holman, Nashville, Tenn., architects.

Board of Education, Newark, Ohio, will take bids at once on general contract for new two-story Roosevelt junior high school, to cost about $225,000 with manual training facilities. Vernon Reading and Associates, Walpark Building, Mansfield, Ohio, are architects.

Chicago Pneumatic Tool Co., New York, announces appointment of W. S. Lynch, formerly district manager at Seattle, as district manager of Cincinnati office. Mr. Lynch succeeds T. G. Smallwood, who has been granted an indefinite leave of absence because of ill health.

St. Louis

ST. LOUIS, July 16.—Plans are being arranged by St. Louis Public Service Co., Park Avenue and Thirty-ninth Street, St. Louis, for remodeling portion of car barn for a general repair shop, with wash house unit, to cost about $75,000.

Market Development Corporation, International Life Building, St. Louis, is planning new cold storage and refrigerating plant, to cost in excess of $100,000 with equipment. Henschien & McLaren, 1637 Prairie Avenue, Chicago, are architects and engineers.

Universal Cutter Co., 4567 Scott Avenue, St. Louis, has taken bids on general contract for new two-story and basement plant, 55 x 115 ft., L-shape, to cost approximately $60,000 with equipment. Alfred H. Norris, 11 Dartford Place, Clayton, Mo., is architect.

L. J. Kent Boiler & Sheet Iron Works, 700 East Brower Street, Springfield, Mo., will soon begin work on new one-story plant, to cost about $30,000 with equipment.

Tonkawa Petroleum Co., Tonkawa, Okla., and Globe Refining Co., Blackwell, Okla., lessee, are said to be planning to rebuild portion of oil refinery at Tonkawa, destroyed by fire July 4, with loss in excess of $85,000 including equipment.

Meeker Advertising Co., Third and Michigan Streets, Joplin, Mo., manufacturer of advertising novelties, signs, etc., is said to be arranging early call for bids for new two-story plant, to cost close to $100,000 with equipment. Smith & Van Pelt, National Bank Building, Joplin, are architects. Lockwood, Greene & Co., 400 North Michigan Avenue, Chicago, are engineers.

City Council, Kansas City, Mo., is planning establishment of municipal airport, with hangars, repair and reconditioning shops, oil storage and distributing buildings, etc., to cost about $1,000,000 with land. City has called special election Aug. 7 to approve bond issue in amount noted. At same time a bond issue of $3,000,000 will be voted upon, fund to be used for expansion and betterments.

Layton, Hicks & Forsyth, Braniff Building, Oklahoma City, Okla., architects, have plans for six-story automobile service, repair and garage building, 100 x 100 ft., to cost in excess of $175,000 including equipment.

Missouri-Kansas Pipe Line Co., Kansas City, Mo., is disposing of bond issue of $1,500,000, a portion of proceeds to be used for extensions and improvements in pipe lines for natural gas supply, compressor stations, and other operating facilities. Frank P. Parish is president.

Union Pacific Railroad Co., Union Pacific Building, Omaha, Neb., has received low bid from Thomas J. Allen, Scottsbluff, Neb., for terminal buildings at Gering, Neb., and will begin work soon, including engine house, one-story machine shop, 27 x 75 ft., oil pumping station, boiler house, 85-ft. turntable, and other units. Entire project is estimated to cost more than $150,000 with equipment. H. C. Mann is chief engineer.

Weinberg & Weinberg Realty Co., 809 Chestnut Street, St. Louis, is at head of project to build ten-story automobile service, repair and garage building, to cost approximately $500,000 with equipment.

Cushing Refining & Gasoline Co., Cushing, Okla., is planning construction of two new gasoline refineries in St. Louis-Pearson district, to cost upward of $100,000 with equipment.

Contract for a 5000-bbl. per pipe still for Okmulgee refinery of Independent Oil & Gas Co. has been awarded to Graver Corporation, East Chicago, Ind.

Paxton Mitchell Co., Omaha, Neb., will build a new foundry, 93 x 160 ft.

City Council, Kirksville, Mo., is considering erection of a municipal electric light plant.

Chicago

CHICAGO, July 16.—Sales of machine tools from miscellaneous sources are holding up well though indications are that July will not be as active as June. Fresh inquiry is coming from scattered sources and the bulk of requests for prices appears to be active. The Commonwealth Edison Co., Chicago, has purchased 11 tools, including one 36-in. lathe for its Fisk Street station. Users of small and medium sized presses are active buyers, one dealer having sold 11 of these machines in the past seven days.

New inquiries from the railroads show more promise than at any time since the closing of the Santa Fe list. The Chicago, Burlington & Quincy will buy an eye bolt machine. The Chicago & North Western is still inquiring for the tools mentioned last week. The Chicago, Rock Island & Pacific will take prices on a hydraulic sectional flanging press, a vertical spindle grinder, a swing frame wood saw and a 6-in. pipe and nipple threading machine. A. M. Castle & Co., Chicago, will buy for its San Francisco warehouse a ⅝-in. x 102-in. gate shear, a high-speed structural material cutting saw, a bulldozer and an angle bar and universal plate shear. A meter manufacturer in Illinois has purchased a 20-in. lathe, and a motor parts manufacturer in Indiana has closed for a 16-in. lathe.

Consolidation of seven manufacturers of dairy machinery and supplies to form Cherry-Burrell Corporation, with assets of approximately $8,000,000, is indicated in announcement that directors have approved the merger. Companies which will be consolidated are J. G. Cherry Co., Cedar Rapids, Iowa; D. H. Burrell & Co., Little Falls, N. Y.; Milwaukee Dairy Supply Mfg. Co., Milwaukee; John W. Ladd Co., Detroit; Cherry-Bassett Co., Baltimore; Wright-Zeigler Co., Boston, and A. H. Barber-Goodhue Co., Chicago.

David Lupton's Sons Co., Philadelphia, manufacturer of steel windows, has purchased 6½-acre tract in Clearing industrial district, Chicago, for erection of a manufacturing plant. Initial building will be 150 x 500 ft. with plans for ultimate expansion to 300 x 1000 ft.

Crown Rheostat & Supply Co., 1908 Maypole Avenue, Chicago, has awarded contract for an addition, 40 x 46 ft.

Tri-City Steel & Supply Co., Rock Island, Ill., has been capitalized at $40,000 and will distribute steel products from its warehouse at 2123 Third Avenue.

H. Channon Co., Chicago, dealer in mill supplies, has purchased Machinists Supply Co., Chicago.

Bids have been asked on general contract by Anetsberger Brothers, machinists, 2725 Lincoln Avenue, Chicago, for new two-story machine shop, to cost about $35,000 with equipment. B. J. Bruns, 1851 Irving Park Boulevard, is architect.

Mokrum-Kleinschmidt Corporation, Southport and Wrightwood Avenues, Chicago, manufacturer of automatic telegraphic machinery and parts, has acquired adjoining property for expansion. Plans for new unit will be drawn later.

Board of Education, Virginia, Minn., plans installation of manual training equipment in a new two-story senior high school to cost $500,000, for which bids are being asked on general contract until July 24. J. A. Codding, National Bank Building, is architect.

Waterworks Department, City Hall, Minneapolis, Minn., J. A. Jensen, supervisor, has plans for one-story equipment storage and repair plant, with department for repair of water meters, to cost $38,000 with equipment.

Terminal Grain Corporation, Grain Exchange Building, Sioux City, Iowa, will take bids for an addition to grain elevator to cost approximately $100,000 with elevating, conveying, screening and other equipment. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., are consulting engineers.

Martin Machine Works, 228 Laflin Street, Chicago, has awarded general contract to Chicago Industrial Construction Co., 53 West Jackson Boulevard, for one-story machine shop, 48 x 125 ft., with foundations to provide for second story later, to cost close to $30,000 with equipment.

Board of Education, Brainerd, Minn., is considering installation of manual training equipment in new three-story senior high school to cost $425,000, for which plans will soon be completed by Croft & Boerner, 1004 Marquette Avenue, Minneapolis, Minn., architects.

City Council, Chicago, has authorized plans drawn by Department of Public Works for an island airport, near Grant Park, to include hangars, repair and reconditioning shops, oil storage and distributing buildings, pumping station and other units, with complete facilities for night flying. A fund of $5,000,000 will be arranged for project.

Altorfer Brothers Co., Peoria, Ill., manufacturer of mechanical washing equipment, is said to have plans for a one-story addition, to cost upward of $40,000 with equipment. H. E. Todd is president.

Kewanee Boiler Corporation, Kewanee, Ill., will soon begin work on one-story unit, 80 x 280 ft., to cost close to $150,000 with equipment.

Kelly Mfg. Co., Clinton, Iowa, manufacturer of furniture, has awarded general contract to William L. Yokum, 730 Main Street, Dubuque, Iowa, for a new three-story factory, 85 x 150 ft., to cost approximately $80,000 with equipment. A. H. Morrell, Clinton, is architect.

Tract of 32 acres at East Chicago, Ind., has been purchased by United States Gypsum Co., 300 West Adams Street, Chicago, as site for new plant for production of rock wallboard, gypsum blocks, plasters, etc., to cost more than $500,000 with machinery.

Detroit

DETROIT, July 16.—Michigan Boiler & Sheet Metal Works, 4120 West Jefferson Avenue, Detroit, is planning a one-story addition, to cost close to $40,000 with equipment.

Consumers Power Co., Jackson, Mich., is planning new power substation at Saginaw, Mich., with capacity of 12,000 kva., to cost close to $200,000 with equipment; later, output will be increased to 30,000 kva. at additional cost of approximately $250,000.

Alloy Steel Spring & Axle Co., Jackson, Mich., has purchased National Plating & Enameling Co., with local plant, and will operate as a unit of its business. Purchasing company has arranged for a stock issue to total $562,500, a portion of fund to be used for acquisition and for expansion in output.

Typographical error was made in this column last week in referring to Gorham Tool Co., 2206 Twelfth Street, Detroit, as Forham Tool Co. Bids will be asked this month for two-story addition on Woodrow Wilson Avenue, to cost about $65,000. Lane, Davenport & Peterson, Charlevoix Building, are architects. L. C. Gorham is president.

Autorad Electric Corporation, Adrian, Mich., recently organized to manufacture radio equipment and parts, has leased space in local plant of Evans-Miller Cedar Products Co., and will install equipment at once.

Murray Corporation of America, Inc., Russell Street and Clay Avenue, Detroit, manufacturer of automobile bodies, plans early erection of new one-story plant, to cost about $80,000 with equipment.

Airport Committee, Bay City, Mich., is arranging for purchase of tract of 175 acres of waterfront property as site for a municipal airport, and will soon begin construction of hangars, repair shops, oil storage and distributing buildings and other units. C. J. Gregory is member of committee.

Wayne County Board of Supervisors, Penobscot Building, Detroit, E. G. Ewald, chairman, has surveys under way for a new airport near city limits, for which a fund of about $2,000,000 will be arranged, to include hangars, repair and construction shops, pumping station, oil storage and distributing buildings and other units.

Fruehoff Trailer Co., 10940 Harper Avenue, Detroit, has awarded general contract to E. Buchman, 3921 Moran Road, for a one-story assembling unit to cost about $65,000 with equipment. H. P. Stihler, 2931 Gray Avenue, is architect.

Detroit Piston Pin & Mfg. Co., Grand Haven, Mich., maker of piston pins and other automotive parts, has changed name to Ottawa Steel Products Co., Inc.

Central Specialty Co., Detroit, manufacturer of automotive castings and plumbing fixtures, has merged with

Ypsilanti Foundry Co., Ypsilanti, Mich., maker of automobile parts. New company will be known as Central Specialty Co. and will have total assets of approximately $750,000. Considerable equipment in Detroit plant will be moved to Ypsilanti and new equipment will be purchased for both plants.

Contract for erection of new $2,500,000 press room addition to plant of Fisher Body Corporation, Pontiac, has been awarded to W. E. Wood & Co., Detroit.

Packard Motor Car Co., Detroit, has awarded to Everett Winters Co. general contract for an aluminum foundry to cost $100,000.

Gulf States

BIRMINGHAM, July 16.—Work will be started by Nitrate Corporation of America, Inc., Marfa, Tex., A. A. Snell, general manager, recently organized with capital of $500,000, on new plant for production of nitrate soda and potash. Company has tract of about 6000 acres and will install crushing and mining equipment for handling 500 tons of material daily. It is purposed to construct an electric power plant at properties at later date. A housing development will be carried out for plant operatives. Initial project is estimated to cost more than $175,000.

Board of Education, Beaumont, Tex., has authorized purchase of 22 acres in Oaks section, western part of city, as site for new high school with manual training department, for which a fund of $900,000 has been arranged. Bids will be asked on general contract soon.

Reed Roller Bit Co., Mack Avenue, Houston, Tex., manufacturer of oil well equipment, etc., has filed plans for one-story machine shop to cost close to $30,000 with equipment.

Warren, Knight & Davis, Empire Building, Birmingham, architects, have plans for one-story automobile service, repair and garage building, 75 x 140 ft., to cost close to $80,000 with equipment.

International Paper Co., 100 East Forty-second Street, New York, is said to be completing plans for new kraft paper mill at Mobile, Ala., where Chamber of Commerce has secured a fund of $100,000 to insure project. Plant will have capacity of 175 tons per day, and will include power house and machine shop. It is estimated to cost more than $3,500,000 with machinery. R. J. Cullen, vice-president, is in charge.

A. & K. Auto Top & Paint Co., 2604-8 Main Street, East Dallas, Tex., is planning to rebuild its automobile body works destroyed by fire July 6, with loss close to $50,000 including equipment. F. Walter Asmussen is plant manager.

St. Petersburg Cold Storage Co., Times Building, St. Petersburg, Fla., has plans for a new four-story cold storage and refrigerating plant, 100 x 125 ft., and for similar one-story unit, 50 x 100 ft., at Clearwater, Fla., to cost close to $275,000 with equipment. C. C. Whitaker, Bona Allen Building, Atlanta, Ga., is engineer. Elliott B. Hadley is company architect.

Board of City Commissioners, S. E. Moss, water commissioner, City Hall, Dallas, Tex., is asking bids until Aug. 8 for equipment for $4,000,000 expansion and improvement program for municipal waterworks, including central pumping plant and machinery, $800,000; complete filtration plant and machinery, $1,200,000; and water distributing facilities, $2,000,000. Fuller & McClintock, 170 Broadway, New York, are consulting engineers. J. B. Winder is chief engineer of Dallas water department.

Gerald E. Melliff, 628 Buena Vista Street, San Antonio, Tex., and associates have plans for a three-story automobile service, repair and garage building, totaling about 26,000 sq. ft. floor space, to cost close to $200,000 with equipment. Work will begin in August.

Airport Committee, Chamber of Commerce, Laurel, Miss., has acquired a tract of 150 acres near city limits for a municipal airport, and plans early construction of hangar, repair and reconditioning shop, oil storage and distributing building, and other mechanical units.

Sewerage and Water Board, 526 Carondelet Street, New Orleans, will receive bids until Sept. 6 for a 15,000-kw. turbogenerator, pumps and accessory equipment for drainage system.

Buffalo

BUFFALO, July 16.—Bids have been asked on general contract by Great Lakes Portland Cement Co., Marine Bank Building, Buffalo, for new four-story mill on Cuyahoga River, near Cleveland, to cost more than $350,000 with equipment.

Northern New York Utilities, Inc., Watertown, N. Y., has approved plans for a new hydroelectric power plant on Beaver River, vicinity of Beaver Lake, with capacity of 12,000 hp., with transmission line to connect with present system, to cost in excess of $400,000.

Field Force Pump Co., Elmira Heights, Elmira, N. Y., has plans for a new two-story factory, to cost approximately $40,000 with equipment. Haskell & Considine, Hulett Building, Elmira, are architects.

Consolidated Aircraft Corporation, 2050 Elmwood Avenue, Buffalo, will establish an airport on 20-acre tract, just outside of city limits, and will use also as testing ground for airplane units manufactured at plant. Hangars, with mechanical and repair shops, and other buildings will be erected.

Herbert T. Dyett, Harry W. Barnard and other officials of Rome Wire Co., Rome, N. Y., have organized Atlantic Insulated Wire & Cable Co., an affiliated interest, with capital of 100 shares of stock, no par value, to manufacture wire and cables for electric service, and kindred products.

Department of Correction, Capitol Building, Albany, N. Y., is said to have plans for a new mechanical shop at State prison, Auburn, for which bids will be asked in fall.

Firestone Tire & Rubber Co., Akron, Ohio, has plans under way for one-story factory branch and distributing plant at Syracuse, N. Y., to cost more than $75,000 with equipment.

Pittsburgh

PITTSBURGH, July 16.—Contract has been let by Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, to V. L. Nicholson, 102 West Clinch Street, Knoxville, Tenn., for two-story and basement factory branch and distributing plant at Nashville, Tenn., 100 x 100 ft., to cost close to $90,000. Marr & Holman, Stahlman Building, Knoxville, are architects.

Transcontinental Oil Co., Benedum Trees Building, Pittsburgh, operating refineries at Bristow and Boynton, Okla., and Fort Worth, Tex., with pipe lines, etc., is disposing of bond issue of $12,000,000, a portion of proceeds to be used for expansion and improvements.

New Kanawha Power Co., Glen Ferris, W. Va., is planning a hydroelectric power development on New River, vicinity of Gauley Junction, W. Va., with two power dams and generating station, to cost more than $400,000. Initial plant will have capacity of 75,000 hp. O. M. Jones, Glen Ferris, is engineer.

Pennsylvania Railroad Co., Pittsburgh, is said to be arranging for early electrification of its division from Rochester, Pa., to Baird, Ohio, about 60 miles.

Plant and property of Becker Steel Co., South Charleston, W. Va., have been acquired at a public sale by R. M. Venable, Charleston, W. Va., and associates, for a price of $44,100. It is reported that a company will be organized to take over and operate plant.

Marvin Mfg. Co., Franklin, Pa., recently organized by George C. Miller and Grant Jones, both of Franklin, with capital of $75,000, plans operation of local plant for oil compounding and lubricating oil production.

Boiler Tube Co. of America, Pittsburgh, has purchased assets of Johnson Peter Co., with plants at Pittsburgh and Brooklyn, distributer of Tyler lapweld steel, charcoal iron boiler tubes and seamless steel boiler tubes.

Milwaukee

MILWAUKEE, July 16.—Prospects for new business in the machine-tool trade are encouraging. The call for tools is holding up well, while inquiry is becoming more active as requirements for fall and winter production are being more or less settled. The dearth of industrial construction that has been noticeable in this locality is gradually being relieved, and the outlook is much brighter than it has been for a long time.

Milwaukee works of International Harvester Co., 784 Park Street, manufacturing tractors and cream separators, will be enlarged by erection of building No. 33, 108 x 301 ft., three stories. Plans have been completed by Worden-Allen Co., engineering department, 208 South La Salle Street, Chicago, which is taking bids until July 23. Work was started a short time ago on construction of a new power and heating plant at Milwaukee Harvester works, to cost about $500,000.

American Metal Products Co., Thirty-fourth Avenue and Burnham Street, Milwaukee, has announced its intention of building a rolling mill this year. Work has just been completed on a foundry addition, 80 x 100 ft., doubling capacity. Company makes a wide variety of castings of a copper-aluminum alloy with a high iron content, for tools, bearings, bushings, packings, golf clubheads, etc. Carl J. Zaiser is president and general manager.

Geuder, Paeschke & Frey Co., 1500 St. Paul Avenue, Milwaukee, manufacturer of stamped and drawn ware, automobile Mufflers, etc., will erect an addition affording 74,800 sq. ft. Building will cost $90,000 without equipment.

Universal Foundry Co., Pine and Warren Streets, Oshkosh, Wis., has broken ground for a one-story addition, 55 x 100 ft., to cost $30,000 equipped. General

contractors are Ben B. Gauthier & Co., local.

Esline Co., 610 Michigan Street, Milwaukee, manufacturer of sheet metal buildings, cottages, garages, etc., is considering sites in Milwaukee County manufacturing area with a view of erecting a complete new plant, it being impossible to expand its present factory further. Company is engaging in production of airplane hangars and plans to triple its present capacity. B. F. Eslien is president.

Minneapolis St. Paul & Sault Ste. Marie Railway has contracted with Peppard & Fulton, engineers, 217 Board of Trade Building, Superior, Wis., for rebuilding division roundhouse at Stevens Point, Wis., installing a new and larger turntable, and other improvements costing about $75,000.

South Atlantic

BALTIMORE, July 16.—Plans have been approved by Central Foundry Co., Dundalk, Baltimore, for one-story addition, totaling about 40,000 sq. ft. floor space, to cost more than $85,000 with equipment.

Continuing expansion program at local plant, Bethlehem Shipbuilding Corporation, Key Highway, Baltimore, has filed plans for another unit, for wood-working and metal-working service, to cost about $100,000 with equipment.

Bids will be asked in August by United Railways Co., Continental Building, Baltimore, for one-story and basement motor bus service, repair and garage building, to cost close to $200,000 with equipment. W. H. Emory, Jr., 18 East Lexington Street, is architect.

Old Dominion Power Co., St. Charles, Va., is said to be planning to rebuild portion of power plant in Pocket section, near St. Charles, recently destroyed by fire, with loss in excess of $200,000 with machinery. Headquarters are at Louisville.

C. Billups Son & Co., Inc., Norfolk, Va., has been formed with capital of $240,000 to take over and expand C. Billups & Son, with local plant for manufacture of agricultural and farm implements and equipment. Cecil Billups heads new organization.

Hudson Silk Hosiery Co., Charlotte, N. C., has approved plans for a new steam power plant at its mill in connection with expansion program to cost close to $75,000.

Union Brothers, 37 West Cross Street, Baltimore, manufacturers of furniture, have asked bids on general contract for one-story addition, 52 x 300 ft., to cost more than $75,000 with machinery. Benjamin Frank, 517 North Charles Street, is architect.

H. A. Dunham, 99 Nerrimon Avenue, Asheville, N. C., Carroll P. Rogers, Tryon, N. C., and associates have organized Feldspar Milling Co., with paid-in capital of $150,000, to construct and operate a feldspar grinding mill in vicinity of Bowditch (Yancey County), N. C., where feldspar dikes have been secured, aggregating more than 1100 acres. Initial mill will have capacity for handling 100 tons of feldspar per day. Mr. Rogers will be president of company, and Mr. Dunham, secretary and treasurer.

Board of Education, Statesville, N. C., plans installation of manual training equipment in new three-story high school to cost $300,000, for which bids will soon be asked on general contract by Martin L. Hampton, Statesville, architect.

United States Coast Guard Headquarters, Washington, is asking bids until Aug. 2 for construction of floating station for Louisville, consisting of steel hull, wood frame superstructure, equipment and appurtenances.

Consolidated Lumber & Milling Corporation, Norfolk, Va., care of R. T. Lipscombe, Norfolk, industrial engineer, is being organized by Mr. Lipscombe and associates to take over and operate eight lumber mills and wood-working plants in this vicinity. It is purposed to construct a central mill on tract of about 200 acres on Eastern Branch of Elizabeth River, with complete wood-working and finishing facilities, conveying and loading equipment for shipments by rail or water. Majority of equipment will be electrically operated. Entire project, including property purchases, is reported to cost upward of $3,000,000.

Indiana

INDIANAPOLIS, July 16.—Allison Engineering Co., Speedway City, Indianapolis, has secured contract from Government for rebuilding 1500 Liberty airplane engines, totaling about $1,000,000, and will develop complete facilities at its machine shops for work. Subcontracts will be let for machined parts, gears, transmissions, etc., including those to Indianapolis Tool & Mfg. Co., West South Street, and Link-Belt Co., North Holmes Street. N. H. Gilman is vice-president and general manager.

Board of Patoka Township School Trustees, Princeton, William E. Daugherty, trustee, in charge, will install manual training department in new two-story and basement junior high school in Baldwin Heights section, to cost about $100,000, for which bids will soon be asked on general contract. Sutton & Routt, Citizens Trust Building, Vincennes, are architects.

Chicago & Eastern Illinois Railroad Co., 332 South Michigan Avenue, Chicago, is said to have plans nearing completion for new locomotive and car repair shops at Evansville, to cost approximately $200,000 with equipment. L. C. Hartley, 6600 South Union Avenue, Chicago, is chief engineer.

Board of Education, Oakland City, is considering installation of manual training equipment in new two-story and basement high school to cost $160,000, for which plans will soon be completed by H. E. Boyle & Co., Furniture Building, Evansville, architects.

Ball Brothers Co., Noblesville, manufacturer of jars, metal jar caps, corrugated containers, etc., has authorized rebuilding portion of plant recently damaged by storm, with loss of more than $30,000.

Leader Specialty Co., 517 East Walnut Street, Indianapolis, contemplates engaging in manufacture of iron pipe nipples and is in market for equipment. C. J. Mick is secretary and treasurer.

State Line Generating Co., Hammond, an Insull interest, is preparing list of tools needed for its new power plant being built in that city.

Cleveland

CLEVELAND, July 16.—While machine business was not as lively the past week as during the previous week, dealers took a fair amount of orders for one or two machines and the volume of sales was about normal for this season of the year. Turret lathes continue in good demand and a local manufacturer did as much business during the first half of July as in all of June, which was a good month. Orders taken by this manufacturer during the week include five or six machines for the General Electric Co. for its refrigerating machinery department at Schenectady, N. Y.

Business is well scattered among various consuming industries although not many orders are coming from automobile manufacturers. The Byers Machine Co., Ravenna, Ohio, purchased a 21-in. lathe during the week and is inquiring for a 72-in. planing machine. Some slowing down in the demand for machinery is expected during the next few weeks.

Plans are being drawn by Triplex Screw Co., 6112 Central Avenue, Cleveland, for a one-story addition, to cost about $35,000 with equipment. A. F. Weber is head.

Federal Foundry Supply Co., 2639 East Seventy-ninth Street, Cleveland, has revised plans and will take bids at once for one and two-story addition, 90 x 255 ft., to cost about $125,000 with equipment. F. A. Welland & Co., 2725 Pittsburgh Avenue, are architects.

American Ice Co., City Center Building, Philadelphia, has acquired Citizens' Necessities Co., Toledo, Ohio, operating ice-manufacturing, cold storage and kindred properties, for price of $1,557,000. Same purchaser recently acquired similar plants at Youngstown, Canton and other cities in eastern Ohio, and has general expansion program in prospect, including enlargements in a number of Toledo units, with installation of additional ice-making machinery.

McKinney Tool Co., Arabella Road and Roseland Avenue, Cleveland, has plans for a one and two-story addition to cost about $25,000. E. G. Hoefler, Keith Building, is architect.

City Council, Lorain, Ohio, is planning establishment of municipal airport on tract of 80 acres west of city, including construction of hangars, repair and reconditioning shops, oil storage and distributing buildings, etc. Mayor J. C. Standen is in charge.

Eaton Bumper & Spring Service Co., 6515 Carnegie Avenue, Cleveland, has awarded general contract to Dresser Co., Arcade Building, for one-story addition, 40 x 90 ft., to cost about $25,000 with equipment.

Pacific Coast

SAN FRANCISCO, July 11.—Contract has been let by Simmons Co., Kenosha, Wis., manufacturer of brass and iron bedsteads, springs, etc., to Barrett & Hilp, 918 Harrison Street, San Francisco, for a three-story factory branch and distributing plant at San Francisco, to cost $200,000 with equipment. Local headquarters are at 295 Bay Street. Ellison & Russell, Pacific Building, are architects.

Union Oil Co., Union Oil Building, Los Angeles, is planning a new storage and distributing plant at Oakland, Cal., to cost close to $100,000 with equipment.

Arizona Magma & Mining Co., Kingman, Ariz., is planning installation of a new selective flotation plant at its Diana properties, to cost close to $100,000. A second unit will be installed of approximately like size later.

Apple Growers' Cold Storage Co., Watsonville, Cal., has approved plans for immediate construction of one-story cold

storage and refrigerating plant, 300 x 500 ft., to cost approximately $200,000 with machinery. Uttley & Kleindinst, 354 Hobart Street, Oakland, Cal., are engineers.

Mountain States Power Co., Tacoma, Wash., has authorized extensions in hydroelectric power plant at Big Fork, near Kalispell, Mont., with additions in transmission lines, to cost $150,000.

Pacific Coast Cement Co., Smith Building, Seattle, has approved plans for a one-story grinding mill unit on East Marginal Way, 86 x 97 ft., to cost about $30,000.

Mason Mfg. Co., Winston Street, Los Angeles, manufacturer of lamps and lighting specialties, cabinet products, etc., has awarded general contract to Austin Co. of California, Inc., for a one-story and basement plant, 120 x 224 ft., to cost about $50,000 with equipment.

Henry Bittman, Securities Building, Seattle, architect, has filed plans for a six-story and basement automobile service, repair and garage building, 60 x 108 ft., to cost about $125,000 with equipment.

National Paper Products Co., 562 Battery Street, San Francisco, has awarded general contract to Chris Kuppler Sons, Port Angeles, Wash., for construction of second unit at its kraft paper mill at Port Townsend, Wash., to cost in excess of $350,000 with machinery. Completion is scheduled by Jan. 1. Barr & Cunningham, Spalding Building, Portland, are consulting engineers.

John Finn Metal Works, formerly at 323 Colman Building, Seattle, has removed to 1934 Railroad Avenue. Company deals in babbitt metal, solders and type metals.

A. Bernth and F. W. Starkey have leased plant formerly operated by Oregon Boiler Works, Klickitat Street, Seattle, and will conduct a general business of repairing and manufacturing contractors' equipment, electric welding, blacksmithing and structural steel fabricating. Mr. Bernth is president of company and was formerly general superintendent of Isaacson Iron Works, Seattle.

Northwest Lead Co., Seattle, making lead pipe, bars, and other lead products, will build an addition at an estimated cost of $25,000.

A. M. Andresen has been appointed acting district manager in Seattle of Chicago Pneumatic Tool Co., in place of W. S. Lynch who has been appointed district manager of Cincinnati territory. Mr. Andresen will be located at 1743 First Avenue South.

x 90 ft., to cost $17,000, exclusive of equipment, which will be purchased later. Gustiana & Zettler, Sudbury, have been awarded contract.

Gustiana & Zettler, Sudbury, Ont., have contract for construction of a power house and heating plant to cost $90,000 for St. Joseph's Hospital.

Erie Iron Works, Ltd., St. Thomas, Ont., has been reorganized and W. T. Greatrex, Toronto, appointed president and general manager. Premises will be enlarged and additional equipment installed.

New Brunswick Electric Power Commission, St. John, N. B., is awaiting approval of Provincial Government to proceed with erection of an auxiliary power plant to be erected at or near Salisbury, Westmorland County. Commission is also considering applications for further installation of service from Shediac to Buctouche. Hon. E. A. Reilly, Moncton, N. B., is chairman.

Fire July 8 destroyed planing mill and sash and door factory of Laidlaw-Belton Lumber Co., Sarnia, Ont., with loss estimated at $150,000.

T. E. Bissell & Co., Ltd., Elora, Ont., has been formed to take over plant and business of Bissell & Co., manufacturers of farm implements, etc. New company is capitalized at $300,000.

James Playfair and Frank M. Ross who control St. John Drydock & Shipbuilding Co., Ltd., have purchased plant of St. John Iron Works, St. John, N. B. Plant will be continued in operation with George H. Waring, manager, who at present is manager of Union Foundry & Machine Works, Ltd. Latter company will pass out of existence, as a consequence of property being taken over by St. John Board of Harbor Commissioners to provide harbor facilities. Playfair-Ross interests will concentrate their mill and industrial work in newly acquired iron works, and reserve drydock plant for marine and structural steel work.

Western Canada

Churchill River Power Co., Ltd., 405 McCallum-Hill Building, Regina, Sask., allied with Whitney interests in development of Flin Flon properties in northern Saskatchewan and Manitoba will install an initial power development plant of 39,000 hp., at Island Falls on Churchill River. Plant will supply power to the Flin Flon.

General Motors of Canada, Ltd., Oshawa, Ont., is having plans prepared by Hutton & Souter, 6 James Street South, Hamilton, Ont., for construction of a power house and other buildings in connection with its $1,000,000 plant at Regina, Sask. Tenders for additional buildings will be called about Aug. 1.

Foreign

ARRANGEMENTS have been completed by Central American Power Corporation, recently organized by W. B. Foshay Co., Minneapolis, Minn., operating public utilities, for purchase of plants and system of Nicaragua Electric Light & Ice Co., Managua, Nicaragua, Central America, for price of $800,000. New owner plans expansion and betterment program.

American Chamber of Commerce in France, 32 Rue Taitbout, Paris, has received an inquiry (F-3700) from a company at Paris interested in purchase of American machinery for metal corrugating service; also an inquiry (G-3699) from a firm at Charente-Inferieure, desiring to purchase a quantity of American confectionery machinery.

A company in Finland has authorized plans for a new sulphite cellulose plant and will arrange list of machinery in near future. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Finland No. 68,410; also Frederick E. Lyon, commercial attaché, Helsingfors, Finland.

In connection with new newsprint and wrapping paper mill of Central Paper Trust of Soviet Russian Union, now in progress near Balakhna, on Volga River, Nijni-Novgorod district to cost $16,000,000, an engineer of the Trust is now in United States, with headquarters at offices of Amtorg Trading Corporation, 165 Broadway, New York, official buying agency of Soviet Russian Government, to make purchases of additional machinery and equipment. Plant is expected to be completed within a year.

Central Electricity Board, London, England, is developing plans for new construction, including new generating plants and additions to present power stations, steel tower transmission lines, power substations, and distributing systems.

Company at Ravensbourne, Dunedin, New Zealand, is considering plans for a new super-phosphate plant for fertilizer service, consisting of several units to cost about $1,250,000, with machinery. Julian B. Foster, trade commissioner, Wellington, New Zealand, has information regarding project.

Canada

TORONTO, July 16.—Following the recent lull, local dealers and builders report a revival of activities in machine tool sales. While the market is far from brisk, orders for single tools total a good volume. A strong demand is reported from northern Ontario mining districts. The automotive industry is buying sparingly at present, purchases being almost entirely for replacement.

National Standard Co. of Canada, Ltd., 133 Woolwich Street, Guelph, Ont., manufacturer of wire braid, etc., will start work immediately on a one-story addition, 62 x 76 ft., to cost $12,000, exclusive of equipment. M. Balconi, 23 Morris Street, has erection contract.

Smith & Travers, Walnut Street, Sudbury, Ont., will erect a machine shop, garage and office building, one story, 30

New Trade Publications

Insulating Materials.—Celite Products Co., Los Angeles. Bulletin 101 of 16 pages with 30 illustrations gives general description of all Sil-O-Cel insulating products, as well as Fraxite high-temperature cement and Celcote waterproofing. The illustrations show these materials in a wide variety of uses, including furnaces of various descriptions, annealing ovens, core ovens, japanning ovens, etc.

Rotary Blowers.—Connersville Blower Co., Connersville, Ind. Bulletin 17A of eight pages, illustrated, describes rotary positive blowers for foundry cupola and large furnace installation, pneumatic conveying, cooling sheet packs, and other blower service requiring large capacity at low and medium pressure or suction. The blowers described have capacities from 4500 to 17,000 cu. ft. a minute. Dimensions and clearance diagrams are given.

Centrifugal Pumps.—Kane & Roach, Inc., Syracuse. Bulletin 1100 of eight pages illustrates and describes a line of single-stage centrifugal pumps for a variety of purposes and of varying sizes, from as low as 10 gal. to a maximum of 5000 gal. a minute. Sand and dredging pumps shown have capacity from 16 to 125 cu. yd. an hour.

Universal Grinding Machines.—Thompson Grinder Co., Springfield, Ohio. Bulletin No. 18, 12 pages, devoted to standard and special features of the 12 x 36 in. universal grinder, which is available in separate countershaft or self-contained motor-driven styles. The countershaft set-up, and the erecting plans of both styles of machine are included.